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TABLE OF CONTENTS ON PAGE 2

Vol. 42 JULY, 1956 No. 7

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CONTENTS FOR JULY, 1956

American Journal of Orthodontics

Original Articles

Editorial

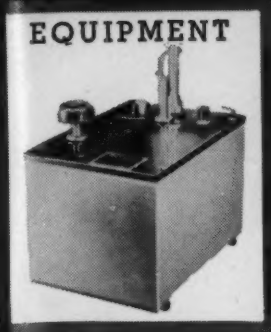
The Fifty-second Annual Meeting of the American Association of Orthodontists

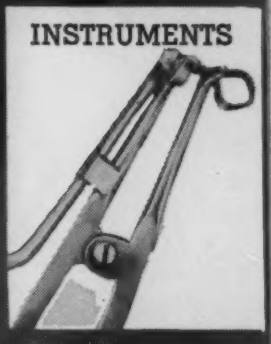
Department of Orthodontic Abstracts and Reviews

News and Notes

Officers of Orthodontic Societies

(Editorial and Business Communications on inside back cover)





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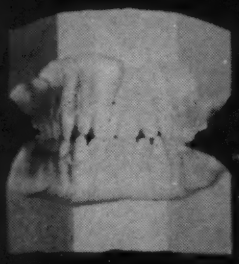

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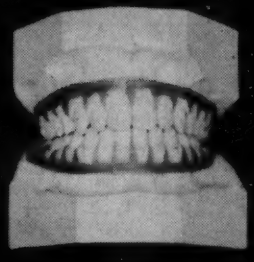

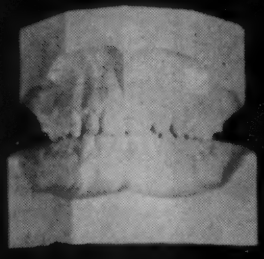

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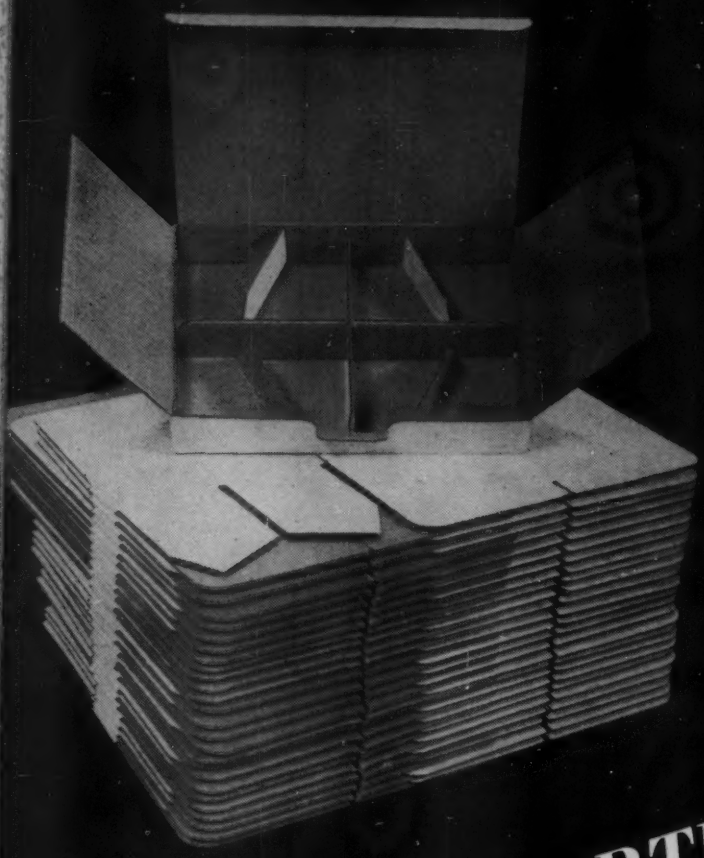

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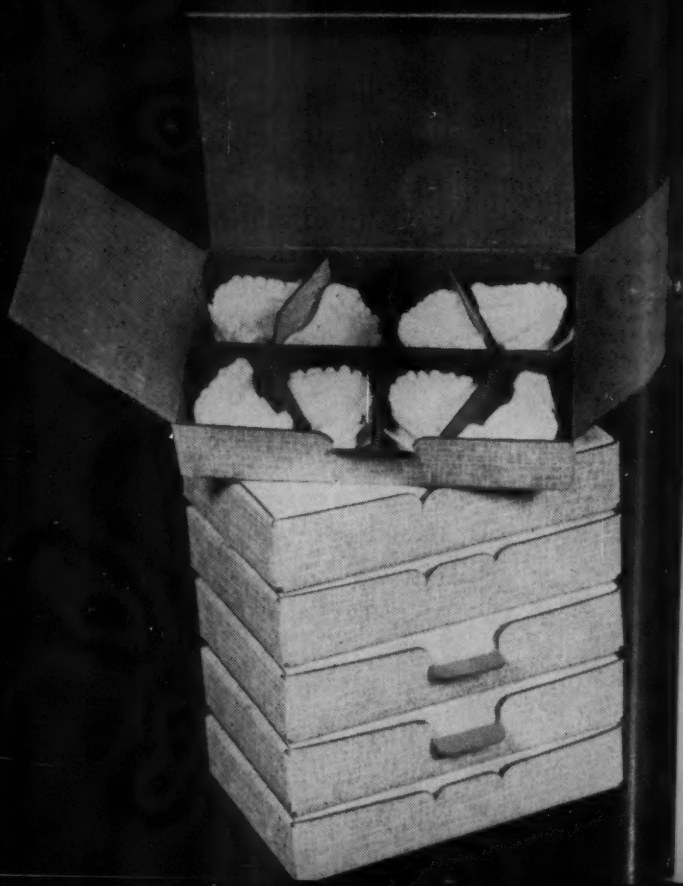

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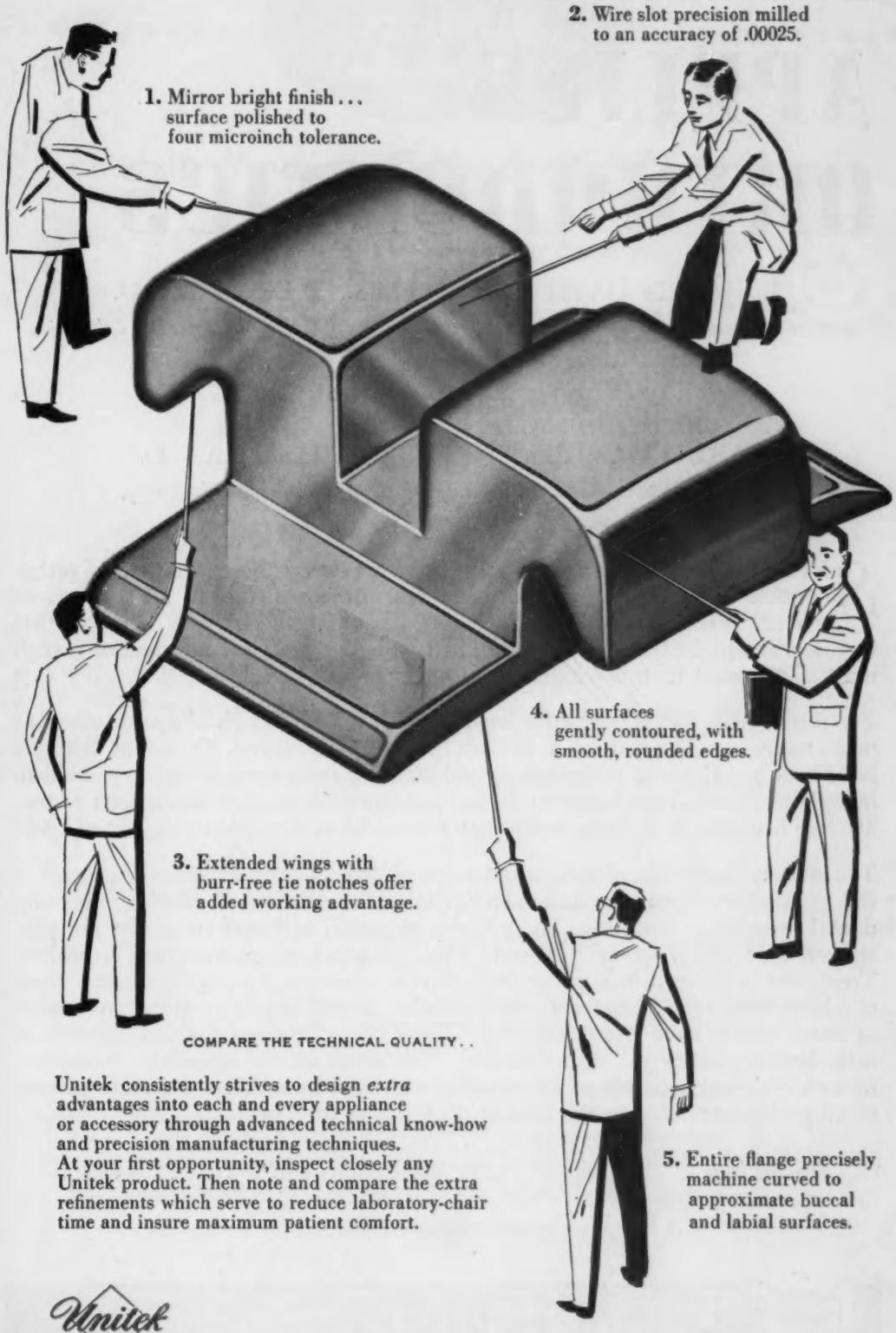

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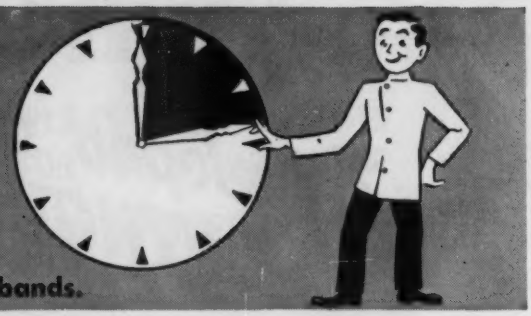

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"Fig. 1."

H.	8.
I.	8.5
J.	9.
K.	9.75
L.	10.50

3. Weld anterior band seating lug on lingual, (Fig. 2.)

"Fig. 2."

4. Harden labial slightly with 114 plier and bring in gingival of mesial and distal slightly with 114 plier, (Fig. 3.)

" Fig. 3."

5. Push on tooth and to finish seating rest Eby Band Driver on band seating lug and tap band to desired position. (Fig. 4.)

"Fig. 4."

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A. C. Broussard, President of the American Association of Orthodontists 1956–1957

Dr. Broussard is a native of Breaux Bridge, Louisiana. A graduate of Loyola University, Class of 1919, he has served as a member of the Loyola Faculty, 1923–1948, professor of dental histology, and demonstrator in orthodontics. He started in the practice of orthodontics in 1920. He has been secretary and president of the New Orleans Dental Association and past-president of the Louisiana State Dental Society and of the Southern Society of Orthodontists. He has served on numerous committee assignments: chairman of the New Orleans Dental Conference, delegate to the American Dental Association, and director from the Southern Society of Orthodontists to the American Association of Orthodontists.

The next A. A. O. meeting, under Dr. Broussard's leadership, will be held in New Orleans, Louisiana, May 12 to 16, 1957.

American Journal
of
ORTHODONTICS

VOL. 42 JULY, 1956 NO. 7

Original Articles

DIFFERENTIAL FORCE IN ORTHODONTIC TREATMENT

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ADELAIDE, SOUTH AUSTRALIA

INTRODUCTION AND SUMMARY OF CONTENTS

THE purpose of this article is to describe a technique for the application of optimum forces for tooth movement by using a single round stainless steel arch wire 0.016 inch, and even less, in diameter.

Although this technique has not previously been described in detail, it has been well tried and proved, as several thousand patients have already been treated with it. All required tooth movements—bodily, torquing, and tipping—can be performed with this technique. As far as I am aware, it has not been possible hitherto to obtain efficient universal tooth movement with any form of arch wire other than rectangular. I also hope to make clear that the use of thin round steel arch wire raises the standard of results, as it eliminates the excessively high forces that are exerted by rectangular arch wire. Active treatment time is greatly reduced, but this technique is not presented primarily because it greatly reduces treatment time. Nevertheless, it is a fortunate coincidence that the orthodontic force values that are used cause least discomfort to patients, least loosening of teeth, and least damage to tooth-investing tissues, while at the same time they are also the forces that move teeth the most rapidly and are the most easily controlled forces.

The number of appointments for each patient and the duration of each appointment are so reduced that treatment of over 200 patients is completed each year.

In this technique, advantage is taken of the principle that, for moving anterior teeth with small root surface area, relatively light arch wire and rubber ligature forces produce the most rapid movement with the least disturbance to tooth-investing tissues. Also, at the same time, these light forces leave the larger-rooted, posterior anchor teeth almost stationary. Conversely, relatively large forces cause the anterior teeth to resist the pressure, so that the anterior teeth, paradoxically, can be made to operate as anchor teeth, as they then move only very slowly, while with this large force the posterior teeth, the so-called anchor teeth, move rapidly.

Values in grams are given for the appropriate forces for accomplishing differential tooth movement. It will be shown that, because of the greater control over tooth movement attainable with this technique, it is possible to utilize extraction spaces to move either the upper, the lower, or both dental arches further forward or backward in the jaws while closing extraction spaces. However, this forward or backward movement of the dental arches can be done only for a distance somewhat less than the full extent of the extraction spaces. Also, it will be shown that the use of differential orthodontic forces makes it possible to carry out simultaneously, and with much greater efficiency, the various groups of tooth movements, such as opening up deep incisor overbites, aligning crowded teeth, closing extraction spaces, correcting anteroposterior occlusal malrelations of all teeth, and bringing down impacted teeth with hooks cemented into them. It will also be shown that it is not only in extraction cases, but also in nonextraction cases, that the advantages of using differential force are obtained. It will be shown that when all groups of tooth movement are carried out simultaneously with differential forces, each group movement reciprocally aids all other group movements so that they are all more successful and more easily accomplished. Furthermore, because the employment of differential forces in a reciprocal manner makes it possible to move teeth more completely to required positions without also moving anchor teeth, it is unnecessary to carry out the well-known preliminary operation in Class I and Class II cases of putting treatment into reverse with Class III intermaxillary elastics, fortified by extraoral anchorage, in order to prevent Class II intermaxillary elastics from causing mandibular anchorage failure. Extraoral anchorage is not required in the treatment of any cases with this technique.

It is not claimed that this technique is new in every respect. However, it is new in so far as universal tooth movements can be performed with differential optimum force values over great distances of tooth movement without appliance adjustments.

ORTHODONTIC FORCE VALUES

Concerning force values and mode of application of force to move teeth at the most favorable rate, and with least tissue damage and pain, Storey and Smith[1] remark that the question of whether there is an optimum force that will give the best results has not been answered up to the present; nor has

the question of whether force should be applied continuously or intermittently been answered. These writers used the edgewise mechanism for experiments with wire spring forces of varying values to move canine teeth distally. First permanent molars, together with second premolars, were used as anchorage for the springs to move canines distally into the first premolar extraction spaces.

Their results[2] showed that a similar behavior of the teeth occurred in all cases studied. They found that there is an optimum range of force values that should be used to produce a maximum rate of movement of the canine. This optimum force did not produce any discernible movement of the molar anchor unit during the period that these experiments were conducted. This force range for moving the canine distally extends from 150 to 200 grams. By increasing the force above this optimum range, the rate of movement of the canine decreases and finally approaches zero. Also, with an increase of force, appreciable movement of the molar anchor unit appears to be consistent with the behavior of the canine tooth, since the ratio of area of contact of teeth with bone, in the canine and molar anchor unit, is approximately 3:8. The maximum rate of mesial movement of the molar anchor unit occurred in the high range of force values, 300 to 500 grams. When the force was below 150 grams for the canine and below 300 grams for the molar anchor unit, neither tooth moved appreciably. When heavy springs were first activated, very little or no movement of the canine occurred. Instead, the molar anchor unit moved in a very marked fashion until the force exerted by the spring had decreased to the range of 200 to 300 grams. This means that the canines were acting as anchor teeth, and the so-called molar anchor teeth were the teeth being moved. With values greater than 300 grams, there is no appreciable movement of the canine and an appreciable movement of the molar anchor unit.

Although the work of these writers was purely experimental, and their findings were not applied by them for full treatment of cases with fixed appliances, they state that their experiments have already yielded sufficient evidence to be used as a basis for future designing of fixed appliances suitable for universal tooth movement.

I have found in practice that, although the light force value advocated by Storey and Smith and perhaps slightly less is the optimum for moving a canine distally, this force need not be increased proportionately, and perhaps not at all, for simultaneous backward movement of the six anterior teeth in order to close first premolar extraction spaces.

The tentative explanation given by Storey and Smith for the different rates of movement of canines and molars, under heavy forces, is that the behavior conforms to the concept of undermining resorption, as presented by Sandstedt,[3] and later supported by Schwarz.[4]

The forces found by Storey and Smith to be most favorable for tooth movement, from the standpoints of rapidity and tissue tolerance, are much lower than those exerted by the edgewise arch wire. Halderson, Johns, and

Moyers[5] state that in many instances the force exerted by the edgewise arch wire is of the very high value of over two pounds, or approximately 900 grams, which causes a pathogenic tissue response. Smith and Storey[6] state that there is no evidence for the claims of earlier investigators that there is no value of force which will bring about tooth movement without causing some damage to the tissues. When investigating this question of tissue damage, neither Oppenheim[7] nor Gottlieb[8] gave accurate values for the forces used.

Steiner,[9] in considering the question of arch wire force, states that any tooth movement might be accomplished with one adjustment if the arch wire were to be reduced sufficiently in size. This, he states, has been proved by all who have used 0.018 inch or even 0.022 inch round steel arch wire in competition with heavier ones. He states that the edgewise appliance principles may some day be applied by using an arch wire of extremely elastic metal of a diameter which may be only a small fraction of that of the cross section of the present one. Steiner also points out that to gain much tooth movement, whether it be rotation, torquing, or mesial or distal tipping, a great deal of force must be applied to distort the short rigid section of the edgewise arch wire enough to accomplish power delivery. Strang[10] considers that no more than fifty new cases should be started each year by the average operator with the edgewise mechanism.

Halderson, Johns, and Moyers[11] state: "Clinicians using the edgewise mechanism have learned to start their cases with a series of light round wires. This is sound therapy for two reasons: (a) it takes as much advantage of tipping movements as is possible and (b) it utilizes forces much lighter than are possible with a standard edgewise wire."

The implication of this statement is that there is now a need for an appliance that will deliver sufficiently light force and, at the same time, accomplish universal tooth movements throughout treatment.

In order to produce an appliance capable of carrying out universal tooth movements with the necessary light optimum force, I have devised a thin round arch wire technique. In this technique, it is necessary to bend the thin round arch wire into shapes that make it perform all required orthodontic movements, including bodily tooth movement. It is here claimed that by using 0.016 inch (diameter), heat-treated, cold-drawn, stainless steel arch wire with the ribbon arch type of bracket band which I briefly described in a previous article,[12] the foregoing appliance limitations can be overcome.

DESCRIPTION OF THE THIN ROUND ARCH WIRE MECHANISM

Horizontal Band Spurs.—Spurs of about 0.030 inch (diameter) round stainless steel wire (Fig. 1) are soldered to the bracket bands to extend buccally or labially in a horizontal direction from the interproximal embrasures of the teeth wherever they are required. They are used for mesial or distal tipping and bodily tooth movements.

Vertical Expansion and Contraction Loops.—These loops (Figs. 3, 4, 5, 6, 7, 8, and 9) are bent into the arch wire and are used for expansion and contrac-

tion of segments of the dental arches, for spacing, rotating, and aligning teeth, and for space closing.

All these movements can be done simultaneously with these loops. These loops reduce arch wire force to optimum values, and also greatly increase the range of tooth movement. When these loops are used, the arch wire can easily be sprung into bracket engagement on most crowded-out and rotated teeth at commencement of treatment. When teeth are more extremely rotated and malaligned, however, they are first ligated to the arch wire until they have been moved sufficiently for discarding the ligature wires and obtaining bracket

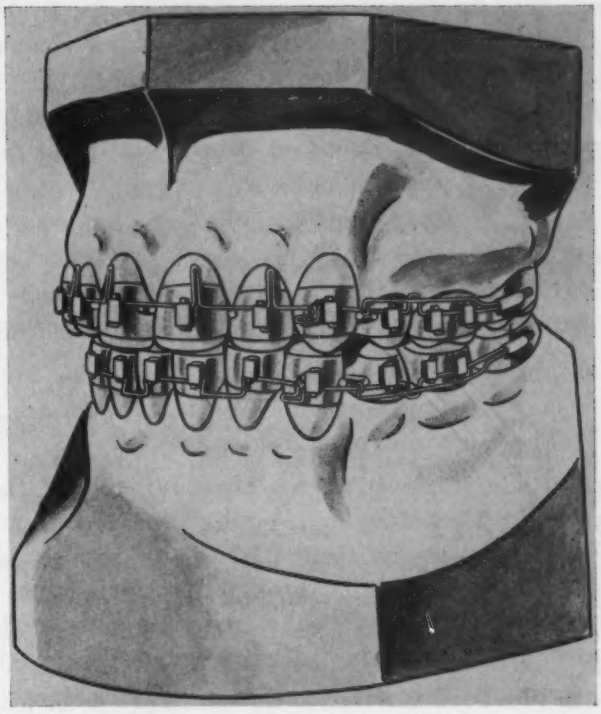

Fig. 1.—The 0.016 inch (diameter) single round stainless steel arch wire mechanism for universal tooth movement. Note the vertical arch spurs extending gingivally and leaning against the upper incisors and the modified form of vertical arch spurs leaning against the lower incisors. Also note the horizontal band spurs extending labially and buccally. Arch wires with vertical arch spurs are not used until irregular teeth have been aligned, either with a plain round arch wire or with an arch wire having expansion loops incorporated into it. It will be observed that intermaxillary hooks are made by bending them into the arch wire.

engagement. When one or more of these vertical expansion or contraction loops are placed on each side of each malaligned tooth in cases of marked tooth irregularity, arch wire force is so reduced that all teeth are very rapidly and painlessly brought into regular alignment without the slightest movement of anchor teeth. Therefore, when this thin arch wire technique is employed, there is no need for preliminary treatment with removable acrylic plates with wires to align irregular teeth in order to avoid displacement of anchor teeth. The use of acrylic plates to align irregular teeth before applying the edgewise mechanism often consumes more time than the whole period of treatment with the thin round arch wire technique.

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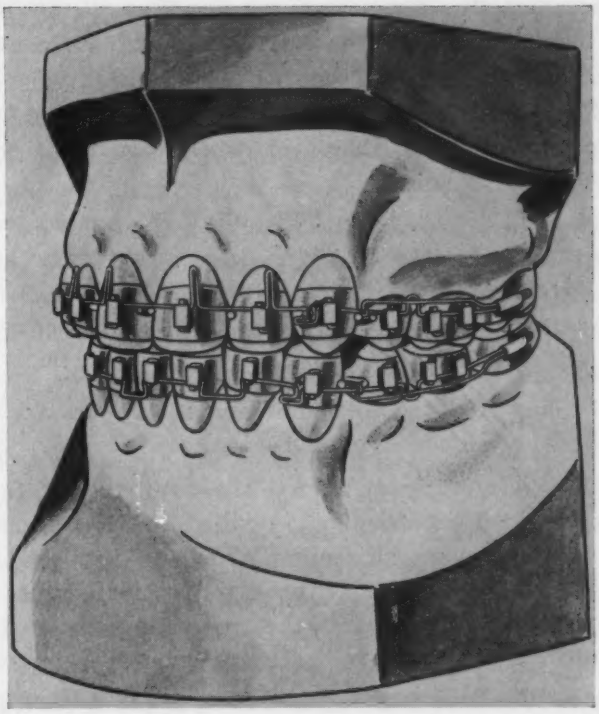

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Vertical Arch Spurs.—Fig. 1 portrays vertical arch spurs formed into the arch wire just distal to the band brackets on each upper incisor tooth. A variation of the form of the vertical arch spur is also portrayed in the lower arch wire. When vertical arch spurs extend gingivally from the arch wire, they either bodily move teeth lingually or tip their roots lingually, according to the extent of their activation. When extending incisally or occlusally, vertical arch spurs either bodily move teeth labially or buccally, or tip their roots in these directions, according to the extent of activation. In fact, if these vertical arch spurs were bent back lingually to a sufficient extent, the angles of inclination of the upper incisors of a Class II, Division 2 case quite easily could be made to protrude labially even further than they do in Class II, Division 1 cases, without once reactivating the arch wire. It is necessary to bring irregular teeth into even alignment by using either plain round arch wires or arch wires having expansion or contraction loops before arch wires with vertical arch spurs are used.

Intermaxillary Hooks.—In addition to their familiar use, these hooks are used for horizontal elastics for closing extraction spaces. They are also used as stoppers against the mesial shoulders of the canine brackets, and as means of attachment for ligature wires to brace the segment of the six anterior teeth.

Lugs and Stoppers.—These and all other auxiliaries are bent into arch wires instead of being soldered to them. When stoppers are used in front of molar buccal tubes they should extend gingivally.

Doubled-Back Ends of Arch Wire.—The free ends of the arch wire are doubled back, as in Fig. 1, in order to accomplish controlled buccolingual bodily or tipping movements of posterior teeth. When the distal ends of the doubled-back arch wire extend too far distally through the molar buccal tubes, as extraction spaces are being closed by elastics, the arch wire is removed from the mouth and a loop is bent into it (Fig. 1) in order to shorten the arch wire.

Pliers Used for Making All Bends Required in the Arch Wire.—S. S. White snub-nosed pliers, No. 139, are used. Two pairs of these pliers are required, as in order to make some of the bends in the arch wire it is necessary to use two pairs at once, one pair in each hand. It is necessary to reduce the thickness of both beaks of these pliers by grinding them down, as many arch wire bends have to be small. Also a shallow, narrow, transverse groove must be cut across only the flat beak of these pliers, very close to the tip of the beak. The purpose of this groove is to allow the arch wire to fit into it so that the arch wire will not slip from the pliers while the arch wire is being held for bending.

CONSTRUCTION OF AUXILIARIES AND AN EXPLANATION OF THE WAY THESE AUXILIARIES BRING ABOUT TOOTH MOVEMENT

Horizontal Band Spurs.—These band spurs are soldered so far away from the band brackets in order to obtain a long lever arm between the bracket and the spur for the arch wire, so that arch wire force will be delivered gently and will produce a long range of tooth movement. Horizontal band spurs are

used not only for mesiodistal tipping and bodily tooth movements, but also to prevent teeth already in good axial relations from tipping mesially or distally as they are being moved bodily in these directions.

Vertical Expansion and Contraction Loops.—These loops are portrayed in Figs. 3, 4, 5, 6, 7, and 8. Whenever possible, these loops should be situated midway between neighboring teeth, that is, as far away from the band brackets as possible. However, there are instances when more than one loop should be used between neighboring teeth (Figs. 4, *D* and 7, *B*). Then, of course, one of these loops will have to be close to the bracket on one of the teeth. Care must be taken to bend the arch wire so that vertical arch loops neither impinge on the gums nor lean out labially or buccally.

Forming Vertical Expansion and Contraction Loops.—To make an arch wire containing these loops, one end of a sufficiently long section of arch wire is passed into the left molar buccal tube until it extends 2 or 3 mm. through the distal end of the tube. While the arch wire is held in this position, it is engaged in the band bracket on the left canine. The arch wire is then gripped mesially and up against the bracket on the canine with the snub-nosed pliers. While the arch wire is still gripped in the pliers, it is removed from the mouth and an intermaxillary hook is formed into it at this position. The arch wire is then engaged into the molar tube and the canine bracket, so that the distal shoulder of the intermaxillary hook is touching the mesial wall of the canine bracket. While the arch wire is held in this position, it is gripped with the pliers further mesially at the point where the first bend must be made for forming the vertical arch loop between the left canine and the left lateral incisor. Formation of the arch loop is then completed. Next, the arch wire is bent to continue on in the correct horizontal plane for engagement in the left lateral incisor bracket. Another vertical arch loop may then be formed midway between the left lateral and central incisors, and so on, until the position on the arch wire is reached for forming the intermaxillary hook of the right side. The distal shoulder of this hook must also just touch against the mesial side of the bracket on the right canine. Formation of the right buccal segment of the arch wire must then be completed. At this stage, the places on the arch wire that are to be engaged in the brackets are bent in such a way that they will overmove all teeth that are to be moved. After this is done, each vertical expansion loop is expanded in order to activate the arch wire for expansion. The two pairs of snub-nosed pliers are used for this operation of stretching open the expansion loops. After the expansion loops have been stretched open far enough to bring about sufficient increase in the distance between the right and left canine teeth, bends must then be put in the arch wire in order to shape it in such ways that each horizontal part of the arch wire (between neighboring expansion loops) that is to be engaged in a band bracket will move its tooth into alignment. For instance, if a lateral incisor has to be brought forward in order to align it, the part of the arch wire that is to be engaged in the bracket on this tooth is bent forward sufficiently to overmove the tooth. Again, if this same lateral incisor also has to be rotated, this same horizontal section of the arch wire is then bent around so that the torque

force it will exert will be sufficient to overrotate the lateral incisor. In cases of crowded incisors, the expansion loops in the labial segment are stretched open to a sufficient extent to create enough space for the regular alignment of the six anterior teeth. Therefore, the distal shoulders of the intermaxillary hooks press against the mesial walls of the brackets on the canines hard enough to move the canines distally. When this operation of forming vertical expansion loops into the arch wire and of activating them is carried out with care, the operation of regularly aligning grossly crowded teeth becomes automatic. The diagrams in Figs. 4, 5, 6, 7, 8, and 9 give examples of the way vertical expansion loops operate. The completed arch wire is then ready for a trial engagement in the brackets. Adjustments, by bending the expansion loops either backward or forward, may be found to be required in order to prevent irritation to the gums or the lips. After this is done, the arch wire is ready for commencing treatment. It is impossible to attain bracket engagement on some very malaligned teeth until a subsequent visit of the patient. However, when thinner arch wire of 0.015 inch diameter is used, immediate arch wire engagement in almost all brackets is surprisingly simple to accomplish. The distal shoulders of the intermaxillary hooks, resting against the mesial sides of the canine brackets, act as stoppers, so that the activated vertical expansion loops bring about dental arch expansion only in the segment of the six anterior teeth.

As the relative positions of crowded, rotated, and generally malaligned teeth vary considerably from case to case, a standard pattern for the positions and for the numbers of arch wire loops that should be used cannot be laid down. As each case of crowded teeth is different from all others, the variations in properly forming arch wire loops and bends are almost infinite. When making the various bends in this thin arch wire, there are many things to be kept in mind. The arch wire stores so much lively, light, and sensitive power that inaccurate forming and activation of any of the loops and bends will cause teeth to move rapidly into wrong positions. In cases where the lateral incisors are grossly displaced lingually and spaces have to be made for them, it is necessary to shape the arch wire so that those parts of it between expansion loops that are to be engaged by the brackets on the lateral incisors will be on a horizontal plane slightly further gingivally than the parts of it that are attached to the central incisors and canines. It has been found that unless this precaution is taken the lateral incisors will be moved too far incisally.

Vertical Arch Spurs.—The most simple form of these vertical arch spurs is portrayed in Fig. 2. If it were not for these vertical arch spurs, it would not be possible to dispense with the use of rectangular arch wire and with the excessive force which it delivers for orthodontic treatment. It would be impossible, without the use of vertical arch spurs, to apply optimum differential forces for universal tooth movement throughout orthodontic treatment. Vertical arch spurs are formed in such positions in the arch wire that they will touch against the band brackets. This is done so that they, being as close to the centers of the labial surfaces of the teeth as possible, will exert force only in the desired direc-

tions. These spurs are preferably placed distally to the brackets, to insure that there will be no creeping apart of the teeth as they are moved. I now make the free ends of these arch spurs to lean over mesially, further than is portrayed in Fig. 1, so that their force will be delivered to the centers of the teeth. Vertical arch spurs are not used in cases having irregularity, crowding, or spacing of anterior teeth, until the teeth have first been brought into regular alignment and proximal contact by arch wires having expansion or contraction loops, or by plain round arch wires, according to the requirement of the case being treated.

Forming Vertical Arch Spurs.—The procedure for forming an arch wire having vertical arch spurs is identical to that already described for forming vertical arch loops, up to the stage where the left intermaxillary hook has been formed. It is necessary to mention here that, during all stages of the process of incorporating vertical arch spurs into the arch wire, the main horizontal line of the arch wire must be kept in a perfectly straight line. The reason for this will soon become obvious. After the left intermaxillary hook is formed in the arch wire, the arch wire is seated in the left canine bracket, so that the distal shoulder of the hook touches against the mesial side of the canine bracket.

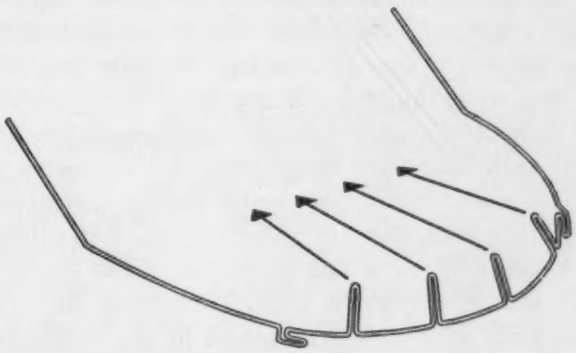


Fig. 2.—The manner in which vertical arch spurs are bent back so that they will move upper incisor roots lingually. This also demonstrates that the free distal ends of the arch wire are bent up. These upward distal bends that are held in the molar buccal tubes are for the purpose of moving upper anterior teeth gingivally.

While holding the partly formed arch wire in this position of bracket engagement, the arch wire is gripped with the snub-nosed pliers at the position where the first bend gingivally should be made to form the left arm of the vertical spur for the left lateral incisor. This position of gripping should be just sufficiently far away from the bracket on the left lateral incisor band that when formation of this vertical spur has been completed its right arm will just touch against the bracket on the left lateral incisor band. With practice, sufficient judgment is developed to grip the arch wire in the correct position for commencing the formation of vertical arch spurs. When formation of this vertical arch spur is completed, the arch wire is again put into the mouth, but is engaged only in the left lateral incisor and canine brackets, so that the vertical arch spur, already formed for the left lateral incisor, is in its correct

position close up against the distal surface of the left lateral incisor bracket. The arch wire is then gripped in the correct position for commencing the formation of the vertical arch spur for the left central incisor. The arch wire is again removed from the mouth while this vertical spur is made. The formation of the vertical arch spurs for the right central and lateral incisors is easier to accomplish, because no calculation is necessary to grip the arch wire at the correct positions for commencing the formation of the vertical spurs for these teeth, as these positions for the first bends to be made are right up against the distal shoulders of the brackets on these two teeth. The next stage is to form the intermaxillary hook for the right side of the arch wire. Formation of this hook is more difficult until the operator has had sufficient practice, because considerable judgment is necessary to decide how far mesially from the bracket on the right canine the first bend for this hook should be made. Formation of the right buccal segment of the arch wire is so simple that no further description is required. Whenever a slight bend is made accidentally in the main straight line of the arch wire, during any stage of the process of forming vertical arch spurs, the bend in the main line of the arch wire is immediately straightened out before proceeding any further. In order to reduce the chances of accidentally distorting the main line of the arch wire at any part of its length during the process of formation of vertical arch spurs, the arch wire is not engaged in the molar buccal tube and premolar brackets of the left side while the incisor region of the arch wire, containing the vertical spurs, is being formed. The arch wire is engaged in the brackets of the anterior teeth only while the vertical arch spurs are being formed. To insure that no distortion of the arch wire from a straight line occurs during formation of vertical arch spurs, intermaxillary hooks, and any other required auxiliaries, the arch wire must be placed repeatedly on a flat glass slab. The straight arch wire and all its auxiliaries should touch the slab throughout the entire length of the arch wire. If the arch wire should be found to be out of alignment, the fault must be rectified before continuing with the forming of the arch wire. The next procedure is to bend the four vertical arch spurs sufficiently far back lingually to meet the requirements of the case to be treated. The four vertical arch spurs are all bent back together, to insure that they are all bent back to the same angle of inclination. This bending back is done while the main line of the arch wire is still in a straight line; that is, it is done before the arch wire is curved to the dental arch form required for treatment. Two pairs of the previously mentioned snub-nosed pliers, one pair in each hand, are required for this bending back of the vertical arch spurs. The arch wire is gripped on the left intermaxillary hook with one pair of pliers held in the left hand. With the other pair of pliers, held in the right hand, the arch wire is gripped just distal to the vertical arch spur for the left lateral incisor. The section of arch wire between the two pairs of pliers is then twisted until the vertical arch spurs have been bent back far enough lingually. A similar twisting of the arch wire is then done mesially to the right intermaxillary hook. Now the straight arch wire is ready to be curved, with the two pairs of pliers,

to the form required for the case in hand. The buccal segments of the arch wire now must have tip-back bends, and any other necessary bends, incorporated into it. The arch wire is then ready for use.

Aligning Slightly Irregular Teeth.—In cases with only slight irregularity of the anterior teeth, vertical expansion or contraction loops are not required. For these cases, a plain arch wire is used, the only auxiliaries being intermaxillary hooks. Slight irregularity of the teeth is corrected by putting bends in the arch wire that will slightly overcorrect the irregularities.

Moving Posterior Teeth With Thin, Round Arch Wire.—To move posterior teeth buccally or lingually, the bends must be much more pronounced than when edgewise arch wire is used, in order to activate this thin arch wire sufficiently.

When buccal or lingual bodily movement of posterior teeth is required, the posterior ends of the arch wire are doubled back, as in Fig. 1. Cross elastics, in the usual manner, are used to aid arch wire force in the correction of crossbite of posterior teeth.

Properties of Thin, Round, Steel Arch Wire.—Standard thin round stainless steel arch wire, just as it comes from the dealer, falls so far short of requirements for this technique that treatment should not be attempted with it.

Following is a description of the preparation that standard stainless steel arch wire requires to give it the necessary properties. Standard round steel wire must be cold-drawn down to the required diameter, whether this be 0.018 inch or less. This operation plays some part in hardening it. Processes of cold-drawing and heating are done alternately until the wire attains its desired properties. Also, special treatment is given to the wire to eliminate skin effect. It is necessary to heat at specified intervals during the reduction of diameter, depending on several factors, including the diameter of the raw material, the analysis, and the diameter of the finished wire. Heat treatment is used to relieve stresses in cold-worked austenitic chromium nickel steels, and to improve their elastic properties. The heat treatment improves the proof stress or yield point and, after this treatment, the yield point figure is 10 to 20 per cent higher than untreated wire. The yield point for stainless steel is generally very close to the tensile strength, whereas in platinized gold this yield point may be 25 per cent below the tensile strength. This description of the preparation of the arch wire was kindly supplied by A. J. Wilcock.

If, in preparing it, the arch wire is made too brittle, it cannot be used, as it breaks when auxiliaries are being bent into it. As the heat required to weld or solder this arch wire causes softening, all auxiliaries must be bent into it. This is no disadvantage, as an arch wire, with the most complicated auxiliaries bent into it, takes no longer than ten minutes to form.

The Angle-Atkinson Tang Wire Principle for Dental Arch Expansion.—The following advantage is taken of the fact that thin stainless steel arch wire softens considerably when heated. When expansion, mesiodistally, of the buccal segments of a dental arch is required in order to make space for crowded teeth,

the distal ends of the arch wire are bent back as in Fig. 1. Before bending back the free ends, the two extremities are heated to soften them as far forward as the places where the bends are to be made. These softened free ends are then doubled back, and the arch wire is seated in the previously described large, rectangular, buccal anchor tubes. These free ends are so soft that they can be used for activating the arch wire for dental arch expansion in the same manner as Angle-Atkinson brass tang wires were used in the tiny ribbon arch mechanism. In order to increase the range of operation and to reduce the expansion force of the arch wire when this tang wire effect is used, one or more vertical expansion loops are bent into the arch wire in its buccal segments.

Examples of the Use of Differential Force.—Separate examples of the use of differential force will now be given to make clear the advantages of using differential force for each of the several forms of tooth movement that are carried out simultaneously during full treatment.

Reduction of Deep Anterior Overbite.—What really happens when rectangular edgewise wires are used to reduce deep anterior overbite is that a considerable amount of the bite opening is brought about by elevation of the mesial portions of the crowns of the upper and lower molar anchor teeth, because excessive force is exerted. Soon after treatment, the anchor molars settle back in their sockets and become uprighted again, and there is a considerable relapse of the anterior overbite.

On the other hand, if thin round arch wires are used, the results are more stable. The force is so light that the anchor molars do not appear to move at all. The only discernible movements are rapid movements, gingivally, of upper and lower anterior teeth.

Closing Extraction Species.—Strang,[12] in reference to closure of first premolar extraction spaces with the edgewise mechanism, states that, in the movement of canines distally, most of the space closing may be due to the forward movement of the anchor teeth instead of the required distal movement of the canines. As additional anchorage to prevent this happening, Strang advocates extraoral anchorage. Failure to move anterior teeth back and inability to prevent posterior teeth from moving forward into premolar extraction spaces are not due to the use of insufficient anchorage, as suggested by Strang, but to the use of excessive force. It here seems appropriate to mention that the recent investigations of Storey and Smith on orthodontic force values were not influenced by my thin arch wire technique, as they were not aware of my technique at the time they carried out their investigations.

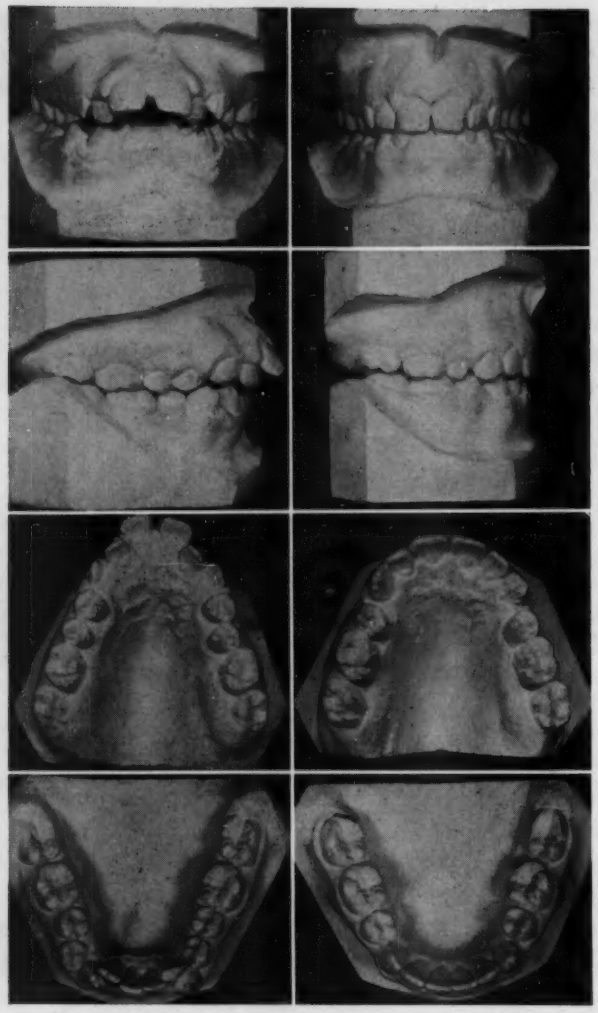
By the following means the six anterior teeth may be simultaneously moved back bodily into the first premolar extraction spaces, without any appreciable mesial movement of the posterior teeth. The thin round steel arch wire mechanism is employed, banding the six anterior teeth. Only the first permanent molars are banded for anchorage. On each side, a light rubber ligature is stretched from the distal free end of the arch wire to the intermaxillary hook on the same arch wire, mesial to the canine tooth. The extraction spaces then close rapidly, and the posterior anchor teeth hardly move

forward at all. The first permanent molars alone are quite sufficient anchorage for this operation of simultaneously moving back the six anterior teeth and of closing extraction spaces, when sufficiently light elastics are used. The only reason for banding the second premolars is to prevent their forward tipping. The light elastic force will insure that the anterior teeth move back before the posterior teeth move forward by the natural process of mesial migration. Small spaces that may still remain can be closed by moving the posterior teeth mesially, by using more powerful elastics that exert force within the greater optimum range for moving molars. To insure that the four upper and lower incisor teeth move back bodily, an arch wire with the previously mentioned vertical arch spurs (Figs. 1, 2, and 3) must be used. Also, horizontal band spurs (Figs. 1, 3, 5, 6, 8, and 9) must be soldered to the canine bands, distal to the brackets, to prevent the canines from just tipping back. In cases where tooth substance is only slightly excessive relative to jaw size, anterior teeth must not be moved back too far. Therefore, heavier elastics must be used that will rapidly move posterior teeth mesially into the extraction spaces while the anterior teeth remain almost stationary. Similarly, in those cases that were referred to in a previous article as requiring removal of eight teeth (four first permanent molars and four first premolas) heavy rubber ligatures are used to close the extensive extraction spaces. This is to insure that the posterior teeth will move forward rapidly while the anterior teeth slowly move back, and only to a relatively slight extent.

Orthodontic Tooth Extractions.—Before presenting examples of patients treated by this thin arch wire technique, it is necessary to mention briefly the importance of tooth extractions in orthodontic procedures.

Teeth have been extracted extensively in the cases reported in this article—not because the thin arch wire technique requires more tooth extractions than other techniques, but because extractions should be extensive for purely biologic reasons. This has been explained in detail in a previous article.[13]

Treatment of Cases With the Single Thin Round Arch Wire Technique.—Fig. 3, *A* portrays models, before and after active treatment, of a case, and Fig. 3, *B* and *C* portrays the shapes of the arch wires as they were before being applied for treatment of this case. All groups of tooth movement required throughout treatment were simultaneously set in motion at the commencement of treatment. In addition to arch wire force, light Class II intermaxillary elastics were applied at commencement of treatment. During treatment, these were tipping the upper anterior teeth back into the extraction spaces. The upper posterior teeth, of course, were not being moved back, because the upper arch wire was allowed to slide back freely through the upper molar buccal tubes. The intermaxillary elastics, exerting only light force, did not move the lower posterior teeth forward. As soon as the upper and lower anterior teeth had been moved into alignment, both arch wires with expansion loops were discarded and replaced by plain round arch wires having no auxiliaries other than intermaxillary elastic hooks. All that then remained to be done was to close the remainder of the extraction spaces with horizontal elastics. Active treatment time was fifteen weeks.

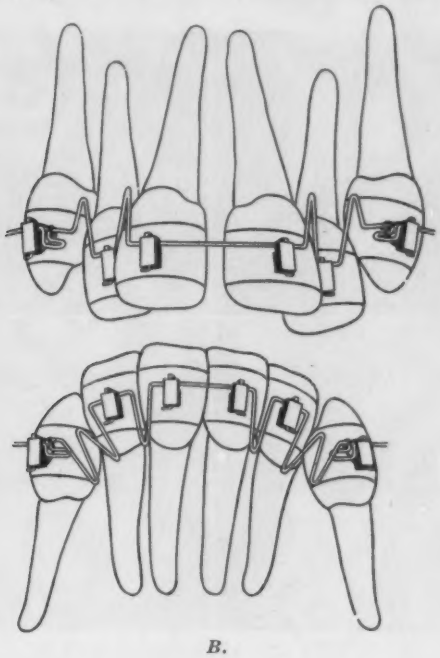


A.

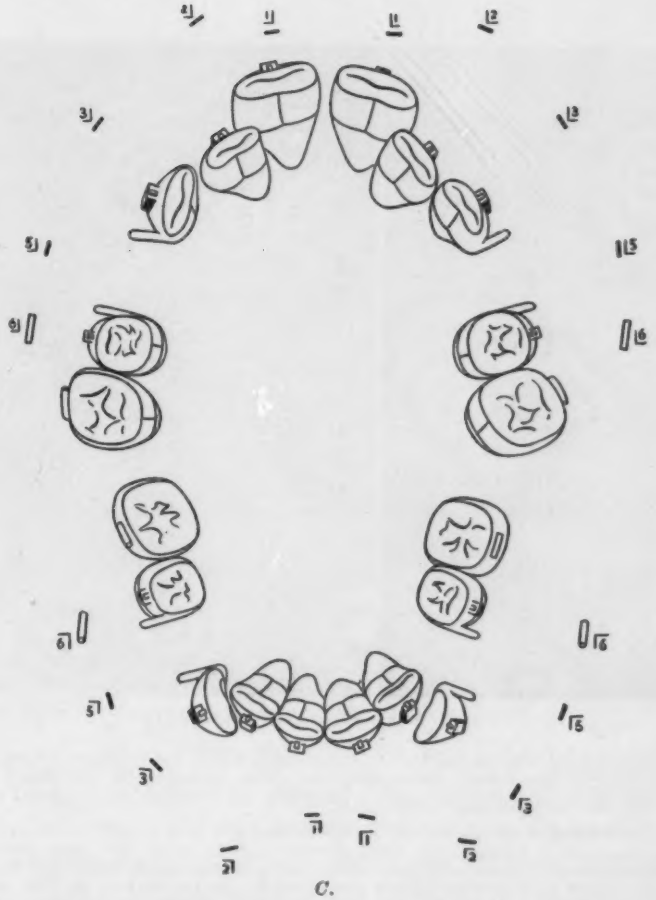
Fig. 3.—*A*, This case was treated with single round 0.016 inch stainless steel arch wire. Active treatment time was fifteen weeks.

B, From these drawings of the front elevation of the appliances used to treat the case portrayed in *A*, it will be seen that vertical expansion loops were used to align the upper and lower anterior teeth.

C, The black lines surrounding the banded teeth indicate the places, relative to each other on the arch wires, that will be engaged in the band brackets in the case portrayed in *A*. From these drawings it will be observed that only when vertical expansion loops intervene between the points of bracket engagement on the arch wires could teeth be moved over such large distances without reactivation of arch wires.

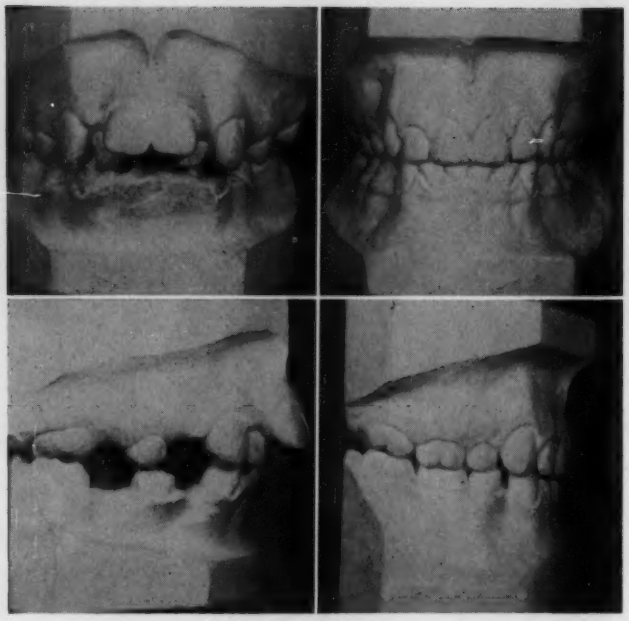


B.



C.

Fig. 3, *B* and *C*.—*(For legend, see opposite page.)*



A.

B. *C.*

Fig. 4.—*A*, Active treatment time for this case was eleven months. Teeth $\frac{6,4 \mid 4,6}{6,4 \mid 4,6}$ were extracted before commencing treatment.

B and *C*, Photographs of patient portrayed in *A*.

D, Vertical expansion loops were used extensively to treat the case portrayed in *A*. As soon as the anterior teeth were aligned, these arch wires were replaced by the arch wires with vertical arch spurs and doubled-back distal ends, as portrayed in Fig. 1.

In the case shown in Fig. 4 eight teeth (four first premolars and four first permanent molars) were extracted. The extractions were done before commencing active treatment, in order to allow the posterior teeth to migrate mesially. Just as in the previously described case, all groups of tooth movement were set in motion simultaneously at commencement of treatment. All teeth were moved to their correct positions by the shortest route. The ends of the upper arch wire were doubled back for almost the whole of the active treatment period, but a doubled-back arch wire was not used on the lower dental arch until after the impacted lower third molars had been elevated sufficiently for them to be banded. The arch wires with expansion loops that were applied at commencement of treatment of this case are portrayed in Fig. 4, *D*. The arch wires that were applied to complete active treatment of this case after the anterior teeth were brought into regular alignment and after the impacted third molars were

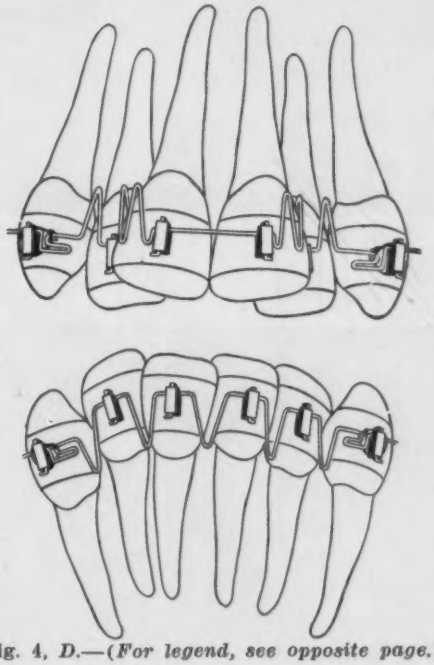
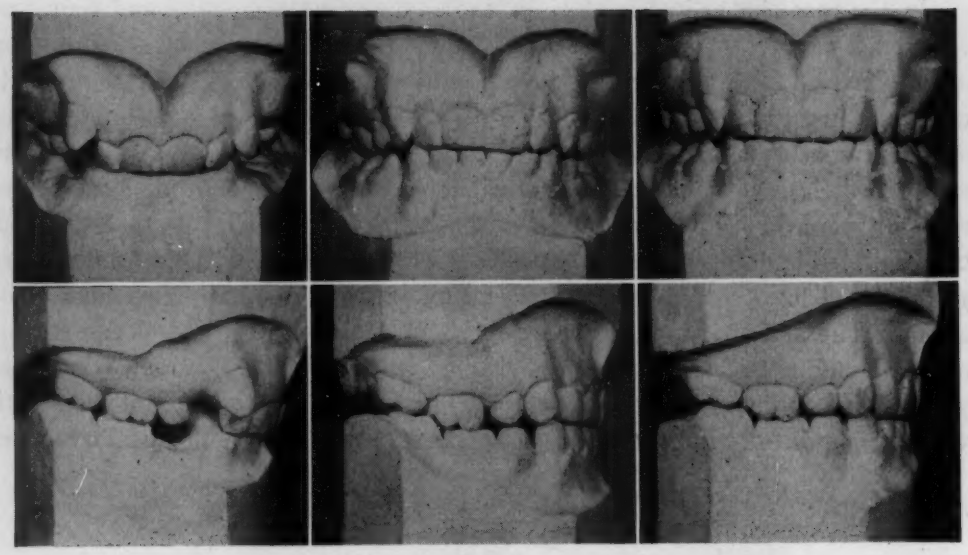


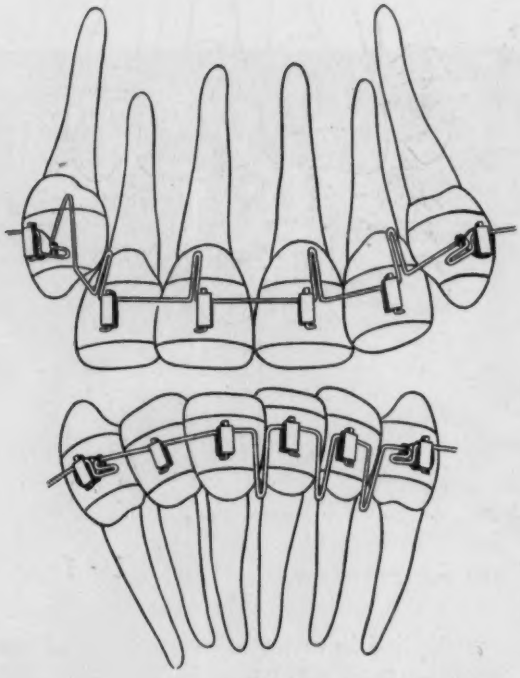
Fig. 4, *D*.—*(For legend, see opposite page.)*

sufficiently elevated are portrayed in Fig. 1, as the finished models of this particular case were used by the artist for drawing Fig. 1. The arch wires with vertical arch spurs were applied in order to prevent the upper and lower anterior teeth from tipping in lingually while these teeth were being moved back onto basal bone, that is, while extraction spaces are being closed.

General Consideration of This Technique.—The order of procedure of treatment with this technique differs in several respects from that with the edgewise mechanism. An important difference is that, from commencement and throughout treatment with this technique, movements of all teeth are simultaneously set in motion along the shortest, most direct paths to the positions the teeth will



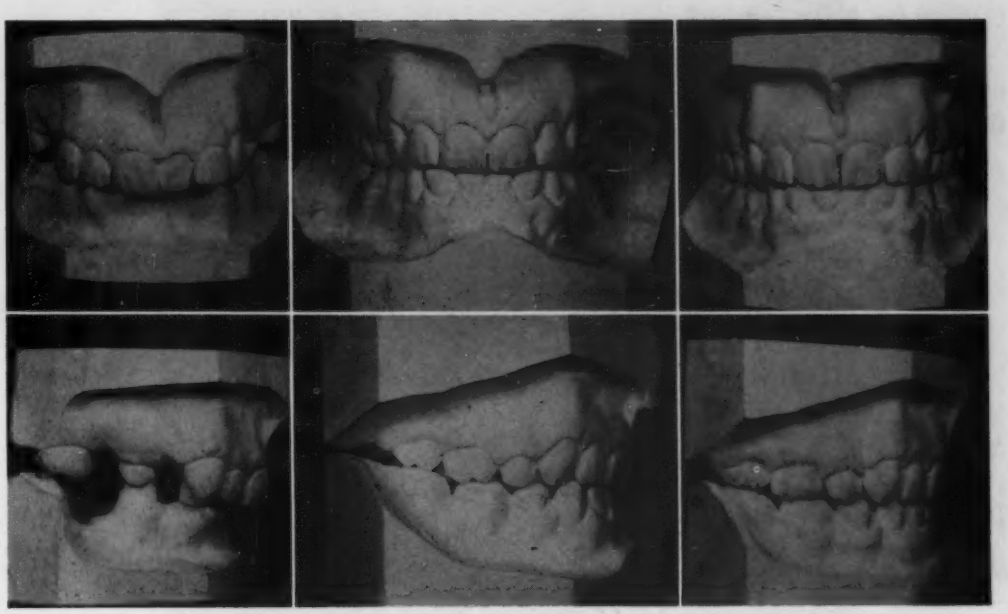
A.



B.

Fig. 5.—*A*, Active treatment time for this case was six months. No retention appliances were worn. The models in the center are of the case at completion of treatment and those on the right are of the case four years later.

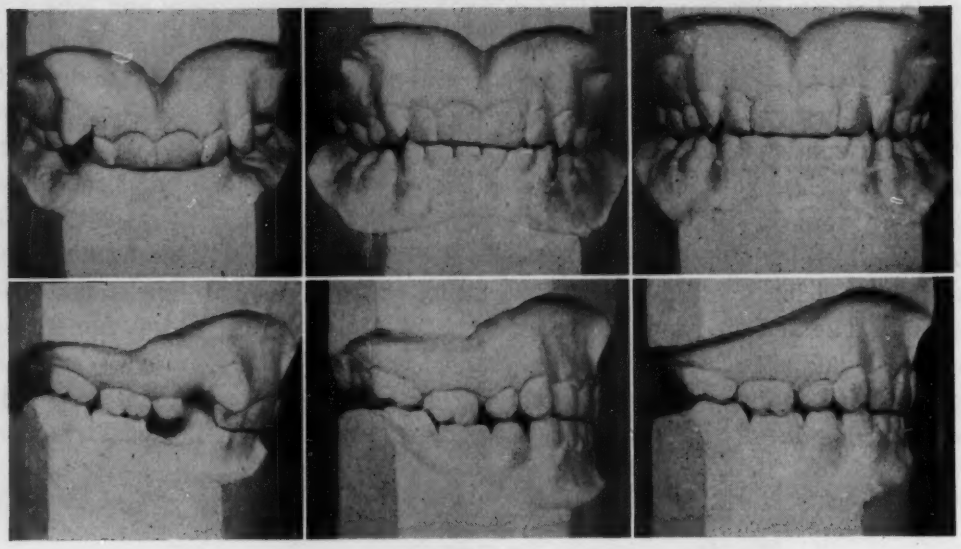
B, Vertical arch spurs were applied at commencement of treatment in the case portrayed in *A*, in order to tip the roots of the upper incisors lingually. A vertical expansion loop was also used to move the upper right canine disto-occlusally. The ligature wire, tying the bracket of the upper left canine band to the intermaxillary hook, should not have been depicted. There should be no ligature wire in this position, as this ligature wire would prevent the upper left canine from sliding distally along the arch wire in order to create space for the rotated upper left lateral incisor.



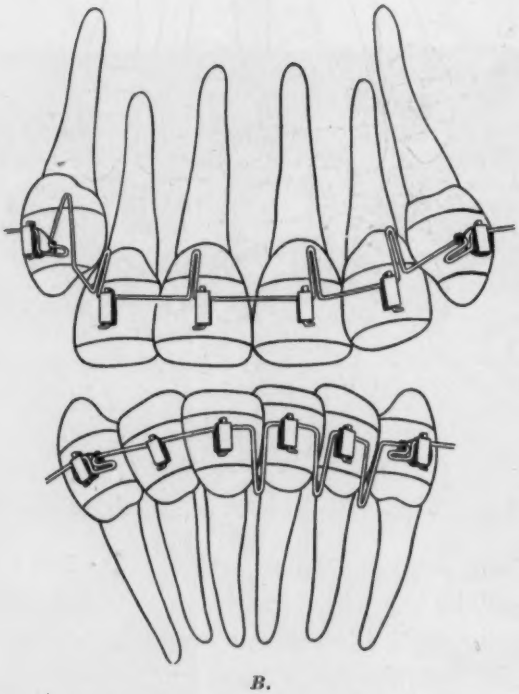
A.

B. *C.*

Fig. 6, *A* to *C*.—(*For legend, see page 500.*)



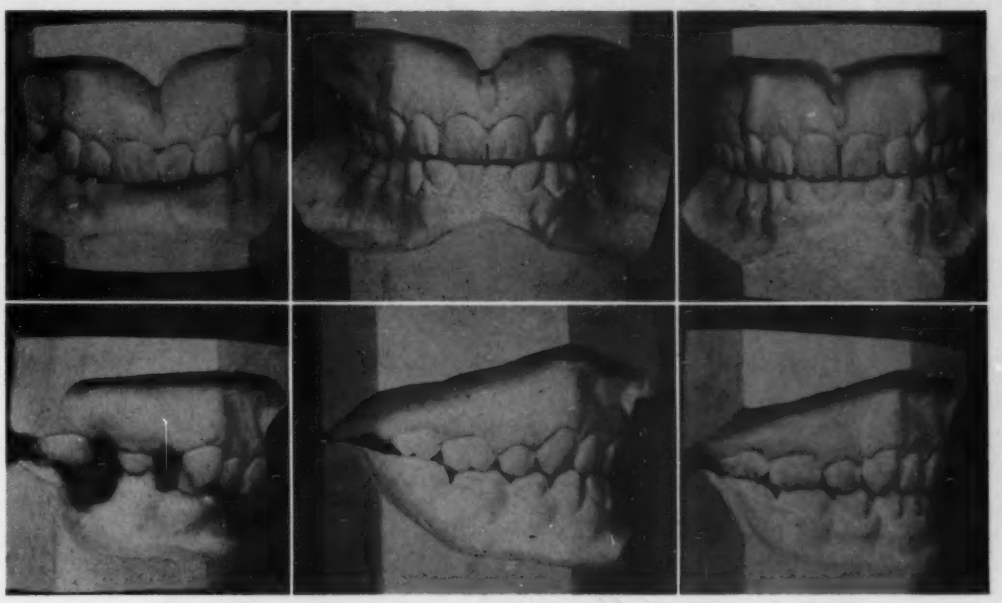
A.



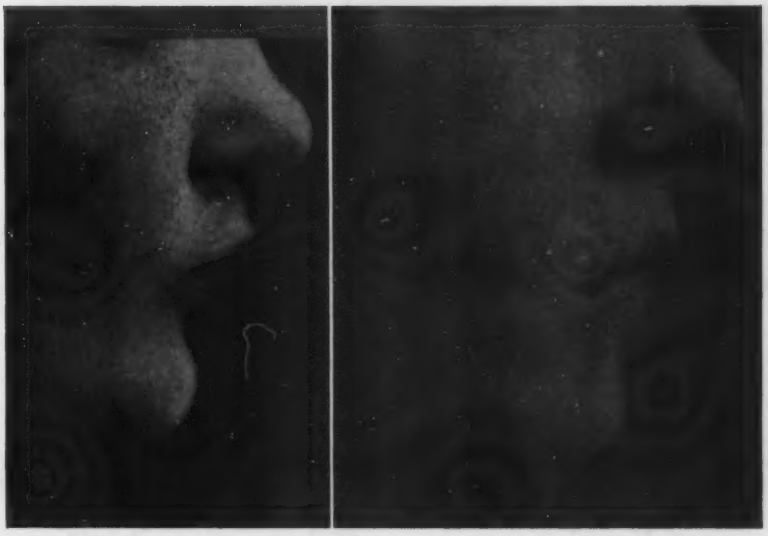
B.

Fig. 5.—*A*, Active treatment time for this case was six months. No retention appliances were worn. The models in the center are of the case at completion of treatment and those on the right are of the case four years later.

B, Vertical arch spurs were applied at commencement of treatment in the case portrayed in *A*, in order to tip the roots of the upper incisors lingually. A vertical expansion loop was also used to move the upper right canine disto-occlusally. The ligature wire, tying the bracket of the upper left canine band to the intermaxillary hook, should not have been depicted. There should be no ligature wire in this position, as this ligature wire would prevent the upper left canine from sliding distally along the arch wire in order to create space for the rotated upper left lateral incisor.



A.



B. *C.*

Fig. 6, *A* to *C*.—*(For legend, see page 500.)*

occupy at completion of treatment. Elaborate precautions are necessary to prevent mandibular anchorage failure when the orthodox edgewise technique is used. Tooth movements are put in reverse by using Class III intermaxillary elastics for a time during treatment by the edgewise technique.

This careful preparation to prevent mandibular anchorage failure is unnecessary when using the thin round arch wire because optimum orthodontic forces are exerted by it.

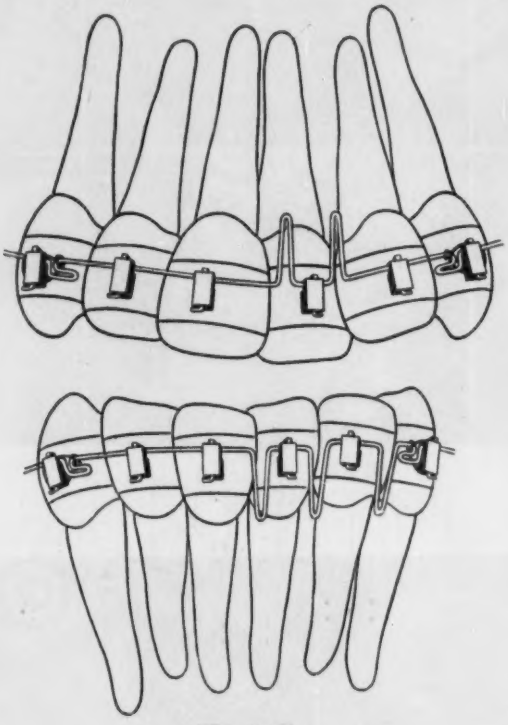


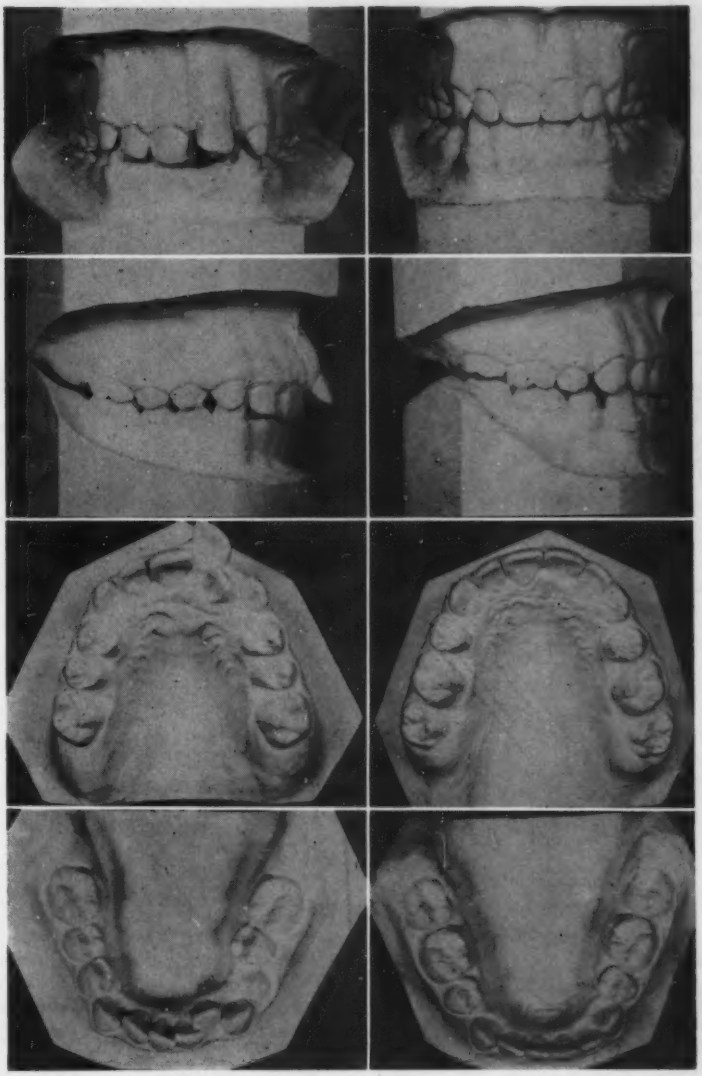
Fig. 6, *D*.

Fig. 6.—*A*, Active treatment time for this 18-year-old patient was ten months. The models in the center were made at the time the appliances were removed and those on the right portray the case three years after discarding the retention plate. Teeth $\frac{6,4 \mid 4,6}{6,4 \mid 4,6}$ were extracted seven months before commencing active treatment. During this interval of time, mesial migration of the posterior teeth considerably reduced the extraction spaces. Teeth $\frac{8 \mid 8}{8 \mid 8}$ erupted during active treatment, unaided by appliances, although they were impacted obliquely forward before treatment. The improvement, after completion of active treatment, in the axial relations of the upper canines and of the upper and lower incisors will be noted.

B and *C*, Photographs of patient shown in *A*.

D, Vertical expansion loops employed to expand the upper and lower labial segments. After the anterior teeth were aligned, arch wires with vertical arch spurs, as portrayed in Fig. 1, were employed to correct the axial relations of the upper and lower incisors.

Prevention of Mandibular Anchorage Failure.—When the thin round arch wire technique is used, mandibular anchorage failure, even in the most pronounced Class II cases with bimaxillary protrusion and tooth crowding, does not occur, even if the two procedures of closing extraction spaces and of wearing Class II intermaxillary elastics are carried out simultaneously. These two operations are carried out simultaneously even when the previously mentioned



A.

Fig. 7.—*A*, Active treatment time was five months. An upper retention plate with a labial wire was then worn for twelve months. The impressions for the models of completed treatment were taken two years after discarding the retention plate.

B, Upper and lower arch wires with vertical expansion loops are portrayed as they were formed before their application for commencement of treatment of the case in *A*. These arch wires are viewed slightly from the left side so that the forms to which they have been bent will be more easily understood.

C, Occlusal view of the banded teeth and of the arch wires used to commence treatment of case portrayed in *A*.

After alignment of the anterior teeth, new arch wires with vertical arch spurs against the four upper and lower incisors were used to complete active treatment.

(*B and C on page 502.*)

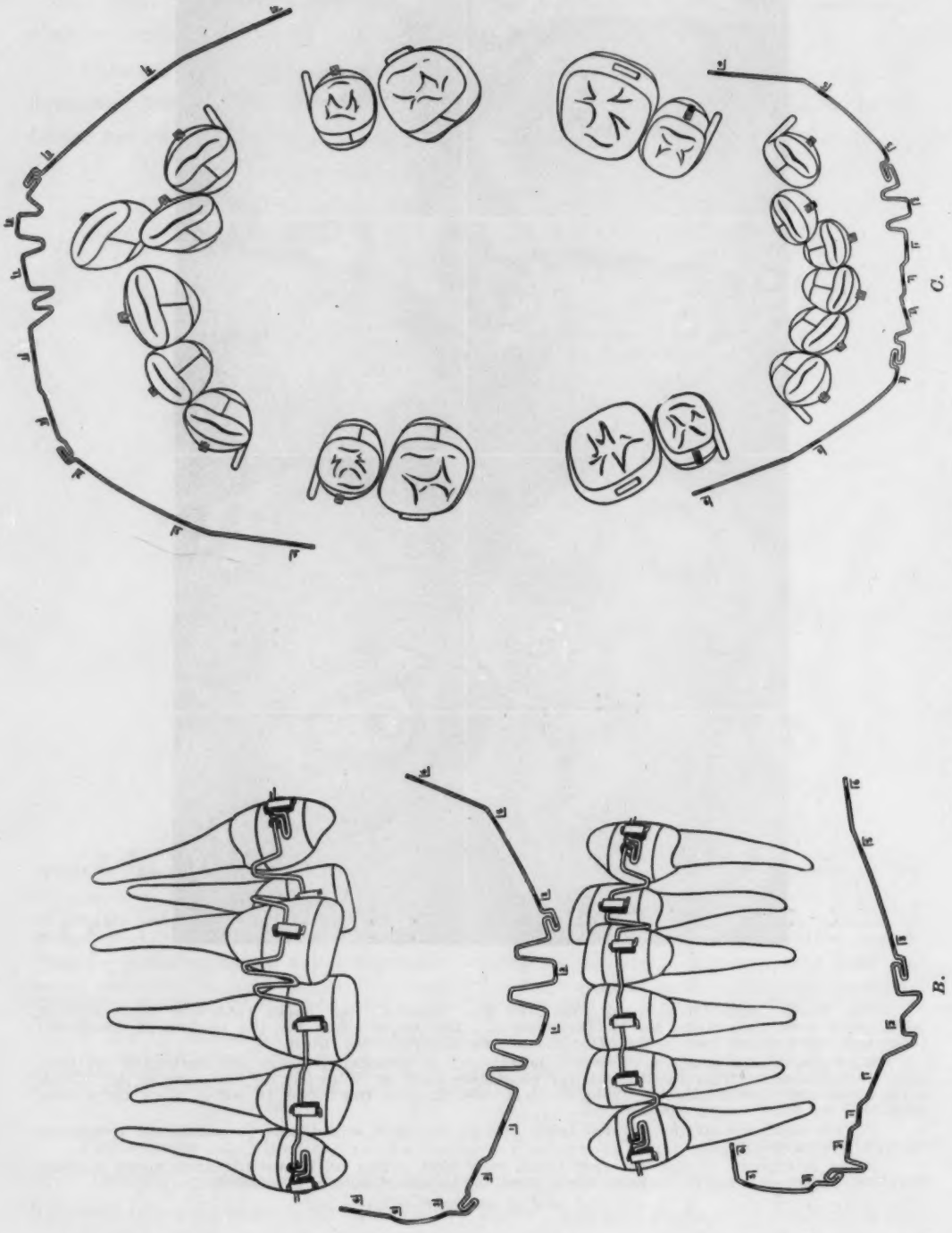


Fig. 7, *B* and *C*.—(*For legend, see page 501.*)

eight teeth are extracted. When these two operations are carried out simultaneously, the extraction spaces act as safety valves to prevent mandibular anchorage failure. What is meant by "safety valve action" is as follows. Elastics that exert light force are used. This light Class II intermaxillary elastic force brings about only slight mesial movement of the lower posterior teeth into the extraction spaces, but the lower anterior teeth are not moved forward, because the lower arch wire slides back freely through the lower molar buccal tubes. However, these Class II elastics move the six upper anterior teeth back into the upper extraction spaces, but the upper posterior teeth are not moved distally, because the upper arch wire slides back freely through the molar buccal tubes.

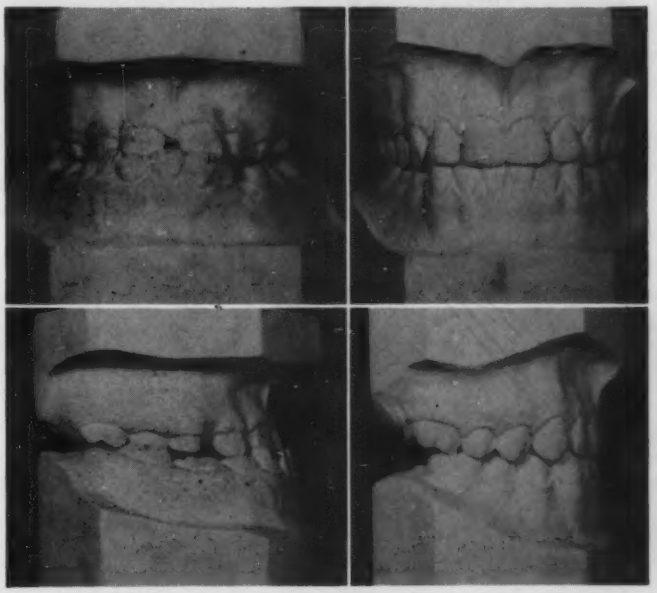
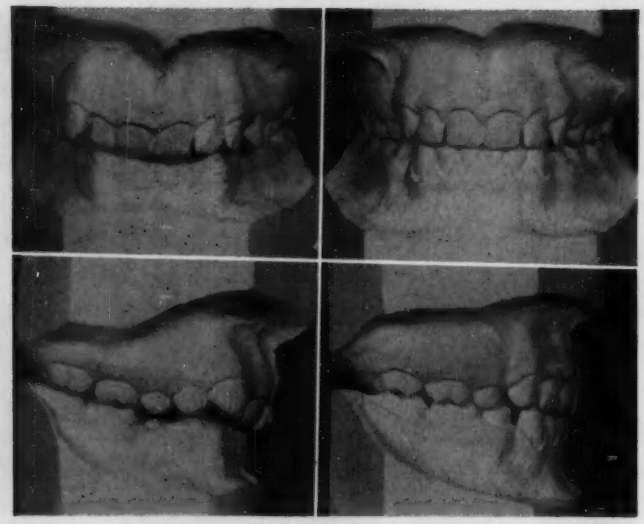
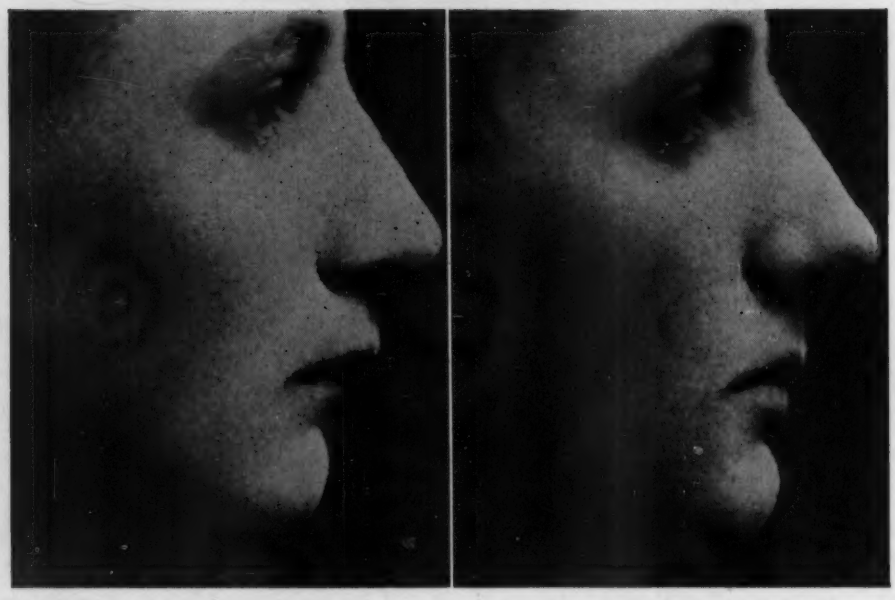


Fig. 8.—Active treatment was done in two stages, with an interval of three and one-half years between these stages, while eruption of the premolars and canines was awaited. The first stage of treatment took six months. The appliances were then removed until the time arrived for the second stage of treatment. The second stage of treatment took six months. In this second stage, vertical arch spurs pointing down incisally were used against the upper incisors, in order to tip their roots labially; also vertical arch spurs, pointing down gingivally, were used against the lower incisors in order to "upright" them as they were moved back by the Class III elastics. Teeth $\frac{7 \mid 7}{7 \mid 7}$ have been extracted because $\frac{8 \mid 8}{8 \mid 8}$ were impacted.

Such a margin of safety is provided by the upper and lower extraction spaces against mandibular anchorage failure that the remainders of both upper and lower extraction spaces still have to be closed by horizontal space-closing elastics after the anteroposterior occlusal malrelations of the teeth have been corrected. In most cases, space-closing elastics are worn at the same time as Class II elastics are being worn. In cases of very pronounced tooth crowding, the four first premolar extraction spaces would close before Class II intermaxillary elastics completely corrected the anteroposterior occlusal relationships if only four first premolars were extracted. Mandibular anchorage failure in these extreme dis-

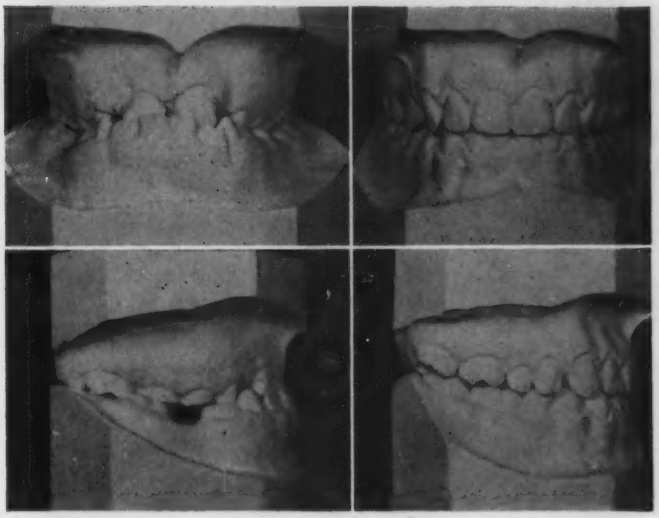


A.



B. *C.*

Fig. 9.—*A*, Active treatment time was six and one-half months. As active treatment of this case has just been finished, a retention plate is still being worn.
***B* and *C*, Photographs of case shown in *A*.**



A.

B. *C.*

Fig. 10.—*A*, Considerable expansion of the upper dental arch was done at the stage indicated in the models taken before treatment was commenced. This expansion, with the simultaneous wearing of Class III elastics, took three months. Four years later a further period of five months of active treatment was required to align premolars and canines. The free ends of both upper and lower arch wires were softened by heating them, and they were then doubled back through the molar buccal tubes to act as tang wires for dental arch expansion, in the manner referred to in the text.

B and *C*, Effects of treatment on the features of the patient shown in *A*.

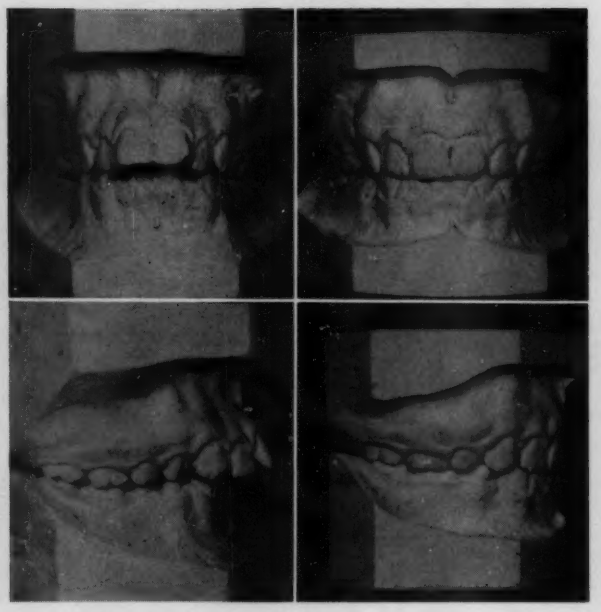


Fig. 11.—Active treatment time was four months. Plain round arch wires of 0.014 inch diameter, without either expansion loops or vertical arch spurs, were used throughout treatment on both dental arches. The arch wires were activated, before being applied at commencement of treatment, to carry out all movements required during treatment. Fortunately, no adjustments to the arch wires were required throughout treatment. The only attention given to this case throughout active treatment was to cut off the excess ends of the arch wires that occasionally protruded distally through the molar tubes, and also to instruct the patient when to put on and when to taken off horizontal elastics for closing premolar extraction spaces. No retention was used on this case. Treatment is considered to have been truly automatic.

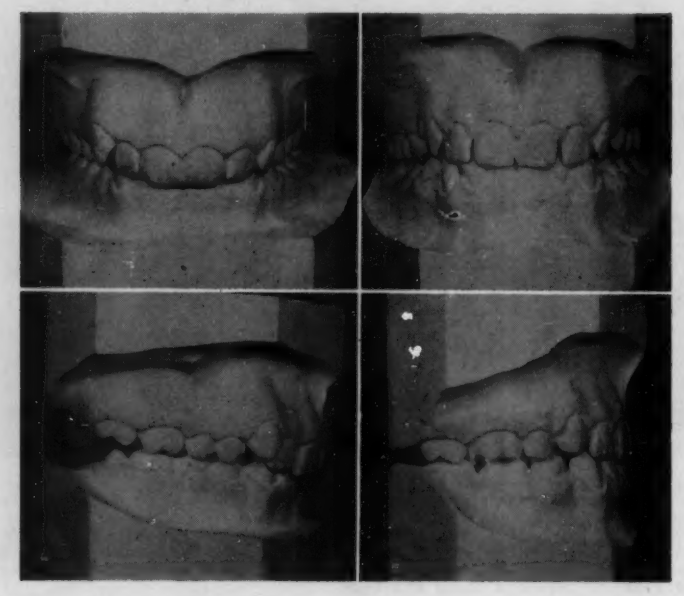


Fig. 12.—Active treatment time was twelve months. This relatively long time for active treatment was due to the caution of using very light Class II intermaxillary elastics because it was feared that, owing to extreme tooth-bone discrepancy, the upper premolar extraction spaces would close before anteroposterior occlusal tooth relations were corrected. No retention plate has been worn. The finished models are of the case six years after treatment.

crepancy cases is avoided by extracting the previously mentioned eight teeth. However, the percentage of cases in which I extract eight teeth is much lower than the proportion presented in this article.

ADVANTAGES OF USING DIFFERENTIAL FORCE

An important advantage of the employment of differential force is that it is possible, while closing extraction spaces, to place all teeth in the dental arch either slightly further forward or back in the jaw, by appropriate variation of the force from space-closing elastics. Of course, this can be done to an extent only within the limits of the sizes of the extraction spaces.

Greater control of tooth movement, made possible by employment of the differential force principle, can be obtained in every aspect of treatment. It is

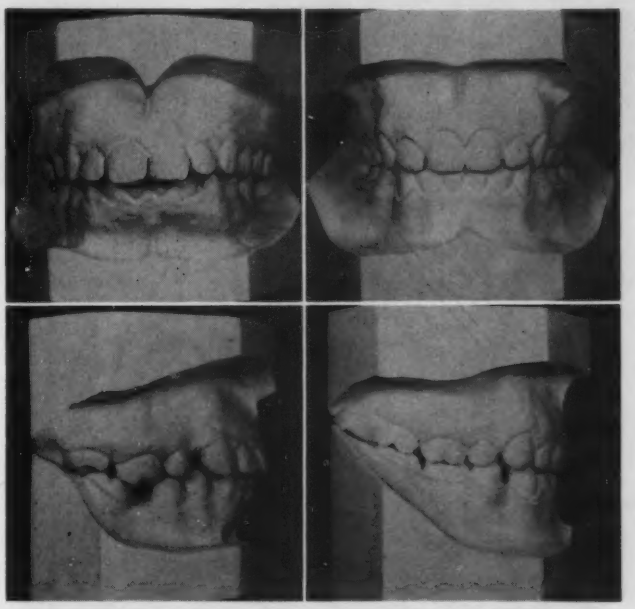
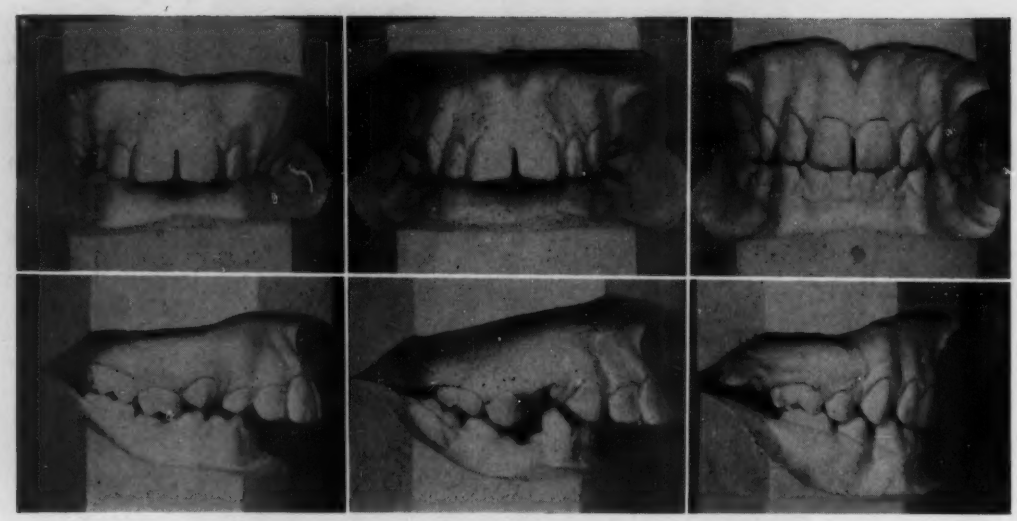


Fig. 13.—Active treatment time of this case was six months. Teeth $\frac{4 \mid}{6 \mid 6}$ were lost because of dental caries several years before the patient presented for orthodontic treatment. Teeth $\frac{6 \mid 6, 4}{4 \mid \_ 4}$ were extract at commencement of active treatment. No retention plate has been worn. Teeth $\frac{8 \mid 8}{8 \mid 8}$ had erupted into occlusion two years after completion of treatment.

for this reason that high standards of results are obtained, even in difficult cases. Great reduction of treatment time and simplification of treatment procedures are not the only reasons for carrying out all required tooth movements simultaneously with this differential force technique. The most important reason is the standard of results attained. Another important reason is that, when various groups of tooth movement are carried out simultaneously, each separate group movement reciprocally aids all other groups, with the result that there is a balanced flow of all groups of movement.



A.

B.

Fig. 14.—*A*, Active treatment was nineteen months. The models on the left portray $\frac{e.\ c\ |}{}$ still present. At that time $\frac{6\ |\ 6}{6\ |\ 6}$ were extracted and the eruption of $\frac{7,\ 3\ |\ 3,\ 7}{7,\ 3\ |\ 3,\ 7}$ was awaited, before commencing treatment. Teeth $\frac{4\ |\ 4}{4\ |\ 4}$ were extracted just before commencement of active treatment. The long time of active treatment is due to failure to wear elastics continuously. *B*, This photograph of the patient shown in *A*, taken three months before the appliances were removed, portrays vertical arch spurs activated to bear against $\frac{2,\ 1\ |\ 1,\ 2}{|\quad\quad|}$ to prevent these teeth from being tipped in too far lingually.

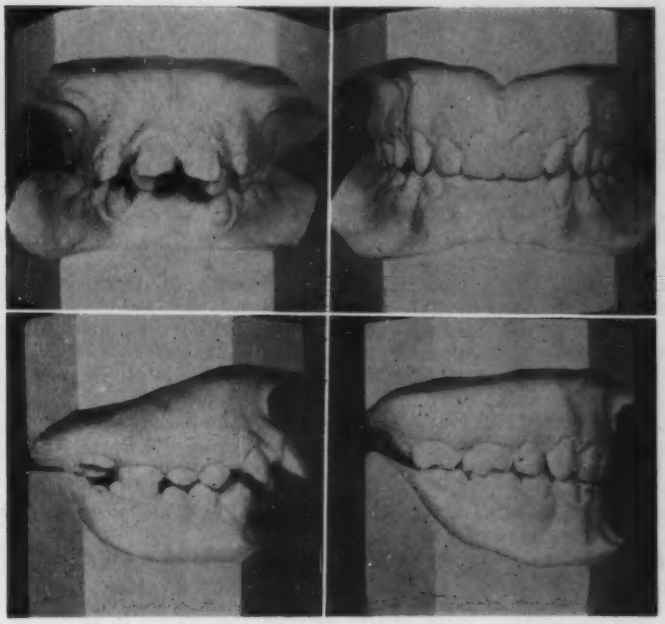


Fig. 15.—Teeth $\frac{6.\ 4\ |\ 4,\ 6}{6,\ 4\ |\ 4,\ 6}$ were extracted just after the original models were made. A period of over two years then elapsed before $\frac{7\ |\ 7}{7\ |\ 7}$ erupted sufficiently to be used for anchorage. Active treatment time was nine and one-half months. A retention plate was given to the patient but, as he did not return again for five years, there is no record of the extent to which it was worn. The models of completion of treatment have been made from impressions recently taken.

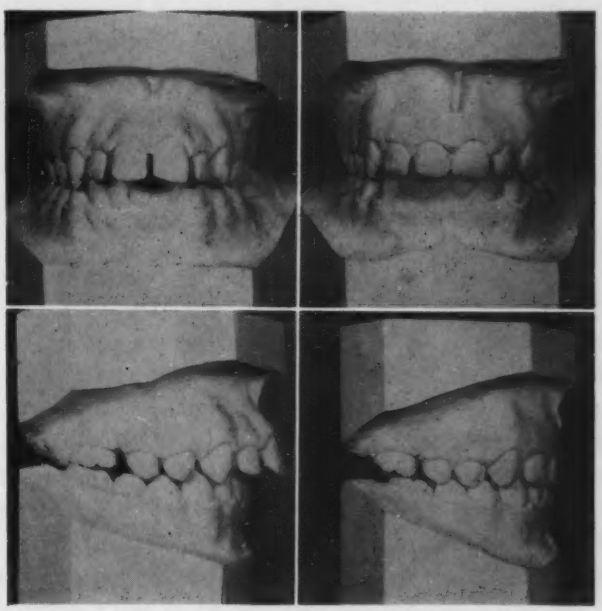


Fig. 16.—Active treatment time was two months eleven days. Teeth $\frac{6\ |\ 6}{6\ |\ 6}$ were extracted several years before the patient presented for orthodontic treatment. A retention plate with a labial wire was worn for twelve months. The impressions for the finished results were taken one and one-fourth years after the retention plate was discarded. The patient made only one visit between the time appliances were put on and the time they were removed. No adjustments were made to the appliances during the time of active treatment. Therefore, treatment of this case is considered to have been automatic.

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170 NORTH TERRACE

THE PROBLEM OF EXTRACTION

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THE extraction of teeth for the correction of malocclusion was practiced in the very early days of orthodontics, even before orthodontics became a recognized specialty of dentistry. Angle defined normal occlusion, and declared that without a full complement of teeth normal occlusion cannot be established. As a consequence, he was firmly opposed to the removal of dental units for corrective purposes, and maintained that the preservation of arch integrity is a basic requirement for successful orthodontic treatment.

The ideals set up by these standards were rarely attainable, and the frequent relapse of treated cases led to the belief that the supporting bony structure was not sufficient to accommodate the excessive tooth material. Because of this discrepancy, it was taken for granted that in many cases normal occlusion could not be maintained, even though the occlusion was carefully adjusted by orthodontic means. In the case of crowded teeth, it was very easy to accept this explanation. It was suggested, therefore, that, inasmuch as there is usually an excessive amount of tooth material present which cannot be accommodated by the available bony support, the best way to meet the problem is to reduce the tooth material by the elimination of a variable number of dental units. Thus, the consideration of extraction as an important part of orthodontic treatment is a direct result of our experiences.

The rigid standards set up by Angle dominated orthodontic thinking up to very recent times; nevertheless, the problem of extraction was brought up for discussion during several extended periods within the past fifty or sixty years. The heated arguments of Angle and Case, the gnathostatic approach of Simon, and the more recent plea of Tweed for facial esthetics represent the high lights of this recurrent controversy. Today the philosophy of Tweed is very widely accepted, and a larger number of teeth are sacrificed as an essential part of routine orthodontic service than at any time in the past. It is not surprising, therefore, to find that an increasing number of orthodontists subscribe to Tweed's teachings. Our experiences seemingly confirm the observation that in most instances the basal bone is not large enough to accommodate a full complement of permanent teeth, for the correction of most malocclusions of the teeth results in a definite protrusion of both the maxillary and mandibular arches. In other words, the teeth are pushed off the basal bones. We already know that Nature does not tolerate such a relationship, because we have seen a very large percentage of cases collapse, even after prolonged retention. In

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the light of such compelling evidence, it is clearly understandable why the Tweed philosophy became so popular. We all had the experiences just described, particularly the frequent relapse of those cases which were protrusive after the completion of active treatment. As a result, we accepted the axiomatic statement that "in most malocclusions the basal bone is not large enough to accommodate the teeth arranged in normal occlusion." This is strongly supported by an earlier observation of Lundstrom that it is not possible to change the apical base by orthodontic means. This, presumably, confirms Tweed's explanations, and together these facts point to the necessity of extracting four teeth for the successful correction of a very large number of malocclusions. There is a close relationship between the basal bone and the apical base, but the relationship is not quite clear. For our purposes, it is not necessary to differentiate between these two concepts and, for convenience, all discussions will be referred to the basal bones. Having stated the basic elements of Tweed's reasoning, it becomes necessary to examine these basic elements separately and to evaluate them in relation to each other. It is well established that the basal bone does not respond to orthodontic stimulation, and the appearance of cases treated without extractions points to the apparent correctness of this observation. In order to reduce the protrusion of the entire dentition, it would be desirable to increase the size of the basal bone. However, in the light of our past experience, this we were never able to do and, therefore, we concluded that we would never be able to do it. While this conclusion may be true, it is subject to several errors. The mere fact that the basal bone has never been enlarged by orthodontic means does not preclude the possibility that some day it may be done efficiently. And again, we cannot be sure that the enlargement of the basal bone is necessary at all; it is very possible that the basal bone will support any enlargement of the alveolar processes which may become necessary to reduce the apparent protrusion. Here, then, is a difference in concepts. In one instance it is claimed that the basal bones must be increased in size, while in the other instance it is maintained that the basal bone will support any amount of alveolar process necessary to reduce the apparent protrusion of the corrected dentition. We cannot be certain that either one or the other of these concepts is true. There is no proof to support the claim that the basal bones are too small or that they cannot support an adequate amount of newly formed alveolar processes to accommodate the corrected dentition. Similarly, proof is lacking to confirm the supposition that the basal bone will support any amount of alveolar bone demanded by the new alignment of the teeth. It is important to consider that, in the absence of conclusive evidence, it is not permissible to draw the conclusion that the basal bone is inadequate or that it is sufficiently large to support the corrected dentition. Notwithstanding, Tweed proclaimed that in most cases the basal bone is not large enough to accommodate the correctly aligned teeth and, therefore, for stable orthodontic results the tooth material must be reduced by extraction. The only proof he offered was the recognized condition that most of the cases corrected without extraction are protrusive and

show a marked tendency to relapse. Both the protrusion and the subsequent relapse are explained by the discrepancy between basal bone and the tooth material which, as we have seen, has not been properly substantiated. There is the possibility that Tweed's reasoning is based on insufficient evidence, and a study of several cases treated without extraction may disclose errors in his fundamental concepts.

It is convenient to begin with a case in which extraction was recommended (Fig. 1). Here, we are not concerned with the correctness of this recommendation, for it is sufficient to know that the patient was brought to my office because the parents refused to accept the previous advice. It had been fully explained to them that it was not possible to treat this case without extraction, as the result would be protrusive and, to use the exact words, "the child would look like a monkey." In disagreement with this disheartening description, I

Fig. 1.

recommended that the case be treated without extraction. Accordingly, the maxillary and mandibular modified edgewise arch appliances were inserted on Nov. 27, 1950, and the active treatment was terminated on Jan. 28, 1953, exactly twenty-six months later. The appearance of the case at that time is shown in Fig. 2; from the point of view of esthetics, it was most unsatisfactory. Every prediction of the orthodontist who recommended the extraction of four teeth was strikingly confirmed. The general practitioner who took care of the other dental needs of the patient eagerly pointed out that, while the experiment was a signal failure, nothing was lost, for the protrusion caused by the twenty-six-month treatment could be reduced after the removal of the four teeth previously condemned. This case could be offered as evidence to confirm the correctness of Tweed's basic concept and to prove that the apical base cannot be enlarged by orthodontic means. It requires little imagination to see that this case, as it

stands, cannot be successfully retained. The teeth are pushed off the basal bones and Nature would not tolerate such a relationship. The discernible disappointment of the parents created a most difficult situation. It became necessary for me to explain that at this stage of treatment all cases appear to be protrusive and that the protrusion will be reduced during the period of retention. It was difficult to convey the thought that the teeth cannot be pushed back by the active appliances and that the protrusion is better reduced by the retainers. Somehow, the explanation appeared to be incredible and unconvincing and the object unattainable. The situation became even more difficult when it was recalled that all this was accurately predicted by the first orthodontist, who was of excellent reputation, who felt that it was not possible to bring about further im-

Fig. 2.

provement beyond this stage. All this was clearly seen at the beginning of the treatment, and I am fully convinced that, with a little persuasion, the patient would have submitted to the extraction of four teeth at this time. I am presenting this case in defense of those who believe that they can render a better service by removing four teeth in the treatment of a very large majority of cases. I have not the slightest doubt that such advise is given with the deepest sincerity. We know that without extraction we invariably produce a protrusion which has never been satisfactorily reduced. The results obtained during the active treatment of this case point to the correctness of Tweed's basic concepts. Very fortunately, the patient consented to continue with the treatment, after I had explained in detail what may happen during retention. Fig. 3 shows the finished case after two years of retention; the impressions for these models were taken on Dec. 27, 1954. A comparison of the models of the finished case

(marked *F*) with the progress models (marked *P*) discloses that the discrepancy between the basal bones and the teeth has completely disappeared. Since the full complement of teeth was retained, the amount of tooth material present at the end of retention was exactly the same as after the active treatment was terminated. The disappearance of the protrusion, therefore, can be explained only by a change in the supporting structures, which may include the basal bones and the alveolar processes. It must be remembered that at the beginning of treatment the patient was 12 years old. Four years elapsed before the impressions for the finished models were taken. During that time the patient had grown considerably, and somehow an adjustment was made to overcome the protrusion. It is quite certain that the basal bones increased in size, perhaps not in response to orthodontic stimulation, but as a result of normal growth. It is also evident that there was a generous increase in the alveolar

Fig. 3.

processes, so that the increase in the size of the supporting structures can safely be attributed to growth in both the basal bones and the alveolar processes. While this may not include all factors which are brought into operation during the entire course of treatment, it definitely rules out extraction as an all-important requirement for successful corrective procedures. It may be argued that this is not a case in which extraction should have been recommended, as frequently happens when the results of treatment without extraction are exhibited; nevertheless, it must be remembered that extraction was recommended in a very definite manner. Without my intervention, this child would have lost four sound teeth and, while the esthetic results would be acceptable, it is very questionable whether the elimination of four teeth could produce as good a result as I have here presented. Furthermore, in the event that extraction in this case should not have been recommended, then the method of diagnosis employed is wholly

inadequate and unreliable. Any system of diagnosis which cannot differentiate, with certainty, the extraction cases from the nonextraction cases is valueless and must be looked upon with great suspicion. Then, again, there are those who will claim that this is only a single case, not sufficient to prove that this can be done in all other cases. In answer to those, I wish to say that in thirty-seven years of practice I did not find it necessary to extract teeth for the treatment of any kind of malocclusion. Reflecting further on the outcome of this case, it is important to realize that the final result obtained does not support the original diagnosis, requiring the removal of four premolars. This is the most important point to consider. Tweed based his reasoning on the fact that at the termination of the active treatment nearly all cases appear to be protrusive. He had shown this to be true on many occasions, and it is further confirmed by the case under consideration. It is certain that the recognition of this fact had a great deal to do with the formulation of Tweed's philosophy. The outstanding factor in his reasoning was the erroneous belief that the orthodontically produced protrusion is always permanently established. *He did not consider the beneficial influence of future normal growth, and did not recognize that at the termination of active treatment the case is not quite completed.* Furthermore, he was unduly alarmed by the frequent relapse of treated cases. This was attributed to the imaginary discrepancy between the tooth material and the supporting structures, forgetting to take into account that perhaps the treatment was not carried far enough to produce more permanent results. The tacit acceptance of the attitude that nothing more can be done was responsible for an orgy of extractions, the like of which we have never seen before. It is interesting to observe that the most unsatisfactory phase of treatment is retention. While devising intricate mechanical methods for the movement of teeth, the problem of retention was entirely neglected. We failed to recognize that most of our retaining appliances are inadequate. They do not retain rotated teeth or jaw relationships which were changed during treatment. Thus, a pair of Hawley retainers would not maintain rotations or hold the newly established position of the mandible. Here, it should be pointed out that Tweed did not examine the possibility that perhaps the frequent relapse of cases during and after retention was due to inefficient retention. His attention was focused on the apparent protrusion which he chose to correct by extraction. There is nothing in the evidence he presented that would confirm the correctness of his procedures. Since it was shown that in one case at least the recommendation for extraction was erroneous, we may inquire as to whether or not this is true in every case. The investigation of this problem, however, meets with many difficulties, and it may be approached in several different manners. The most simple approach is to treat those cases in which extraction was recommended without extraction. If all such cases could be treated satisfactorily without the removal of teeth, it would prove either that extractions are never indicated or that the original diagnoses were incorrect. So far as the patient is concerned, it makes very little difference which is correct and, under all circumstances, the patient should

refuse to submit to extraction. It makes a great deal of difference to us, as orthodontists, which one of these is the truth. Since, in all the hypothetic cases, extraction was recommended and it was assumed that subsequently these cases were successfully treated without the elimination of dental units, one of the

Fig. 4.

conclusions would be that extractions are never necessary. The other conclusion, that the diagnoses were not correct, is not tenable because it is unthinkable that only those patients in whom incorrect diagnoses were made would refuse to submit to extraction.

A better approach to this problem would be to treat all patients without extraction, keeping in mind that, inasmuch as the cases are not selected to demonstrate a specific point, there would be a number of those in which extraction was previously recommended. In addition, there will be cases in which the extraction of teeth was never suggested. This group would also contain a number of such cases in which extraction should have been resorted to. In the event that all those patients can be successfully treated without extraction, we must arrive at the conclusion that extractions are never necessary. On the other hand, if a number of cases relapse after a reasonably good retention period, then the probability remains that in a selected number of cases extraction should have been recommended. It must always be kept in mind, however, that unconditional cooperation is assumed in every instance, for a case may fail because of the carelessness of the patient.

For the study of this problem, my practice contained all the necessary elements. As I have stated before, I never found it necessary to extract for corrective purposes and the results to be presented justify my attitude. In collecting the material for this study, it became important to define the objective and to outline an acceptable method of procedure. It was realized at once that, if the cases were especially selected to prove a definite point, impartiality in the selection would not be possible. To eliminate the human element, I have accepted Tweed's suggestion that in a study of this kind a review of a large number of consecutively treated cases would prove most satisfactory. When I received the invitation to contribute to this meeting, the collection of data was already in progress, and I already had some fifty or sixty completed cases showing (1) the original conditions, (2) the appearance of the case at the time active treatment was discontinued (marked *P*), and (3) at the end of the retention period (marked *F*). The object of collecting these data was to obtain 100 consecutively treated and completed cases from my practice. It became clear that certain difficulties would arise which must be thoroughly explained before the project just outlined could be successfully undertaken. Since the series of models are consecutively numbered from 1 to approximately 1,800, this collection of models reflects, first of all, the various methods of treatment which I have employed during thirty-seven years of practice, which embrace the labial, lingual, labiolingual, and modified edgewise arch appliances. In addition to this, different methods of retention were used at different periods, exploiting the newer bite plates, mass distal movement appliances, etc., which were developed to overcome the deficiencies of those retaining appliances which are widely accepted and are still in general use. It was pointed out to me that a well-treated case does not need very much retention, and that the problem of retention does not depend on the retaining appliances. Notwithstanding, I have given up the use of all standard retainers and depend entirely on the recently developed Vitallium adjusters. The collection of models represents approximately 1,800 patients who were treated by various appliances and retained differently during different periods. Of course, these were not all excellent successes and there were many failures and relapses, not to mention those which were only tolerably acceptable. But they had one thing in common, namely,

that they were all treated without extraction. A further examination of these models disclosed the fact that the excellence of results improved with the years. With the development of newer appliances, it was possible to treat each successive case more meticulously; this, together with efficient retention, produced more stable results. It is certain that the skillful manipulation of the active appliances has much to do with stability. There is nothing startling in this disclosure for we all know that, everything else being the same, an operator who has had more experience will be the more skillful. The accumulation of the records of 100 consecutively treated and completed cases taken from the same practice would eliminate differences in manipulative skill.

However, in the accumulation of such data other difficulties arise. The bulk of the consecutively numbered models represent cases which are accepted for active treatment but, in addition, there are models of those patients who are under observation and who may or may not receive treatment in the future. Furthermore, a number of cases are transferred to orthodontists in distant locations, and a few may discontinue treatment before the case is completed. It is clear, therefore, that the models of the consecutively treated cases in my practice are not consecutively numbered. There will be occasional lapses in continuity, in conformity with the number of cases under observation, transferred, or discontinued. Under no circumstances should these lapses in continuity be interpreted as failures purposely withheld from the consecutive list. To make this study an important contribution, failures as well as successes must be reported. Another difficulty encountered is the time required to complete treatment. Some cases can be finished in twelve months and others may require two and one-half or three years, so that, while nearly all consecutive cases may be completed within a certain period, there may be a few still under treatment which cannot be considered finished. More time is required for a successful treatment of those patients.

To insure a list of 100 consecutively treated and completed cases, it is a routine procedure in my practice to take impressions of every case after the active appliances are removed and also at the end of the retention period. These will be supplemented by models of each case out of retention for three years. This will require a good deal of time, but it is hoped that it will be possible to complete this study. Inasmuch as I do not as yet have a consecutive list of treated cases, I shall present fifty successfully completed cases which show that no orthodontic case should be considered finished at the time the active appliances are removed. Without exception, they show a decided improvement during the retention period, so that it can be safely said that each case is definitely improved during retention. I wish to call special attention to this fact. I know of no other method of retention that would do this for us, and I submit that the retaining appliances in general use at this time are wholly inadequate. The relapse of treated cases is due not so much to discrepancies between the basal bone and the tooth material as to inadequate retention. The evidence presented by these cases will show that Tweed's concept of the disharmony between basal bone and tooth material is erroneous. The only logical conclusions we can draw from the consistent improvement of the dentition and occlusion during

retention are that an orthodontic case should not be considered completed at the time the active appliances are removed and that there is something seriously wrong with the accepted methods of retention and retaining appliances. Tweed showed us many cases which were protrusive at the end of active treatment and which subsequently relapsed. He failed to recognize that, by the use of other than the standard retaining appliances, a better harmony can be established between the basal bone and the dentition; in fact, he held this to be impossible. The acceptance of the insufficiency of the basal bone left only one thing for him to do, and that was to resort to extraction. The evidence to be presented will prove that such discrepancies rarely, if ever, exist. In view of the consistent improvement of the cases during retention, it becomes necessary to modify Tweed's philosophy. Since it was possible to bring about an improvement in even the most protrusive cases, we are compelled to recognize that Nature provided the alveolar processes to make up for any discrepancy between the basal bones and the dentition. It follows, therefore, that the amount of alveolar process required to support the normally aligned teeth may vary within wide limits. This brings us to a better understanding of the functions of the alveolar processes and also to the further conclusion that the basal bones will support any amount of alveolar process required by a normal dentition. The problem is how to develop the required quantity of alveolar processes. This we have tried to do by means of the active appliances, but failed because of the frequent occurrence of root resorptions. By means of the Vitallium adjuster, it was possible to develop the alveolar processes in every one of the fifty cases to be shown, and we must recognize an attempt on the part of Nature to provide a sensitive and delicate medium to compensate for any discrepancies between tooth material and basal bones. It is unthinkable that this should be otherwise, and the violation of the alveolar processes by extraction must be looked upon as inimical to the welfare of the patient.

A problem arose in connection with the photographing of the models. Since three stages of each case are represented in three views, nine exposures had to be made for each case. For the front views the photographic plate was set up perpendicular to the sagittal plane of the models, but the lateral views had to be arranged in such a way that the actual occlusion of the posterior teeth would be recorded. The buccal cusps of the maxillary posterior teeth are several millimeters buccal to those of the lower; therefore, it makes a great deal of difference how these views are taken. If the camera is so arranged that its principal axis is perpendicular to the sagittal plane, the buccal cusps of the maxillary teeth will appear on the photograph mesial to their actual position (Fig. 5). In this particular instance, the maxillary central on the opposite side will not be visible. When the principal axis of the camera is made perpendicular to the line drawn through the buccal cusps of the posterior teeth on the side being photographed, then the buccal cusps of the teeth will be projected along lines parallel to the principal axis. Thus, the photograph would represent the true occlusion of the posterior teeth. In the event the camera is so set up that its principal axis makes an angle of less than 90 degrees with the line drawn through the buccal cusps of the teeth, then the cusps of the maxillary teeth will

be projected distally. *By appropriate arrangement, it is possible to favor the actual occlusion, and a Class II or III case may appear to be normal.* In order to maintain some degree of uniformity, an attempt was made to photograph all cases in such a manner that the principal axis of the camera was approximately perpendicular to the line connecting the buccal cusps of the posterior teeth. This was accomplished by establishing a white line parallel to the plane of the film. Since the sides of the art portion of the maxillary models are trimmed so that they are approximately parallel to the posterior cusp lines, the sides of the lower casts will also be parallel. Before exposure, the models were placed into occlusion and the side of the lower cast was put against the white line. The resulting photograph represents approximately the actual occlusion of the teeth. Before showing the results of the treatment of fifty cases, it should be explained that in many instances extraction of four teeth was recommended.

Fig. 5.

But, since these cases represent all kinds of malocclusions, they contain those who did not consult other orthodontists and who would have received recommendation for extraction. I shall attempt to indicate those in which extraction was previously advised, and to point out those who would have received such advice if they had consulted other orthodontists before. Again, cases are also included in which the removal of teeth would not be considered necessary, even by the most ardent supporters of Tweed.

The important points to observe in these cases are:

1. The appearance of the case
   a. at the beginning of treatment
   b. at the completion of active treatment (the removal of all active appliances, *P*)
   c. at the end of the retention period, *F*.
2. That the protrusive appearance of all treated cases is general, and that it cannot be considered normal at the completion of orthodontic treatment.
3. The complete disappearance of protrusion at the end of the retention period.
4. The improvement of every case during retention.

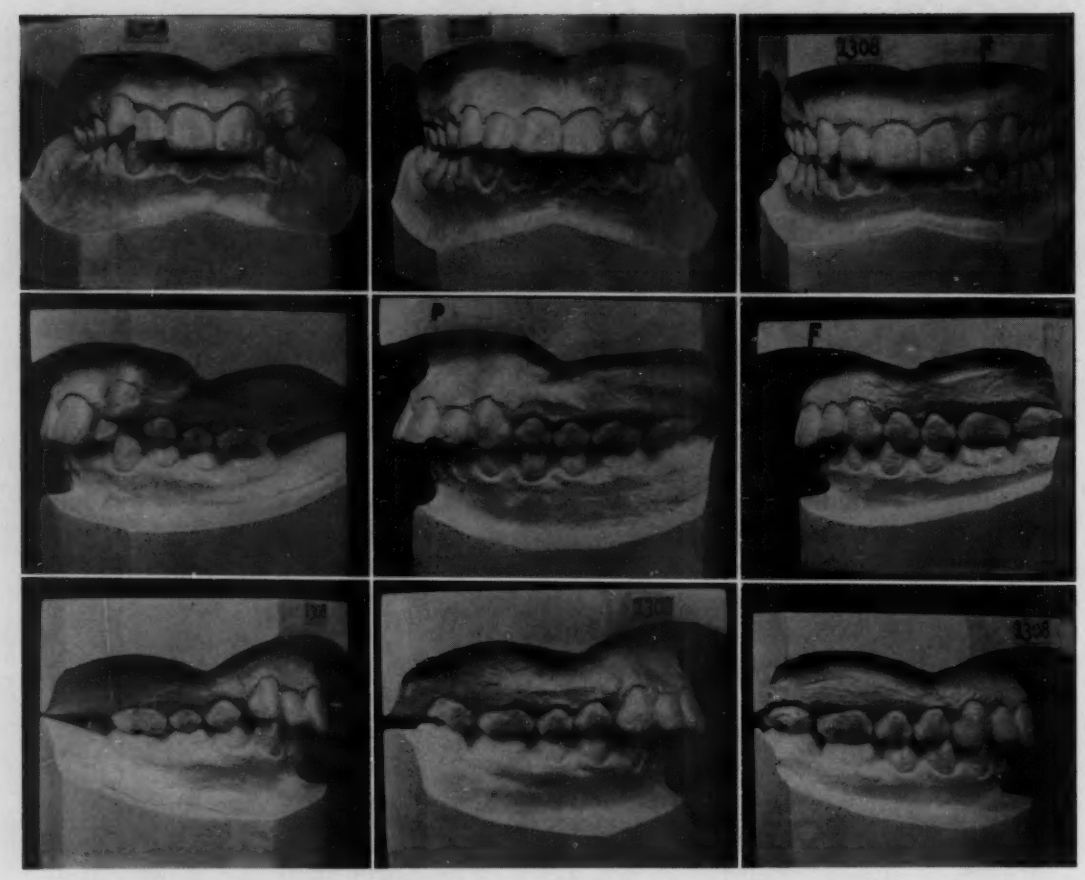


Fig. 6.—Impressions. Original, Jan. 1, 1950; *P*, Feb. 1, 1953; *F*, Dec. 27, 1954.

Fig. 7.—Impressions. Original, Jan. 9, 1951; *P*, May 2, 1952; *F*, March 19, 1954.

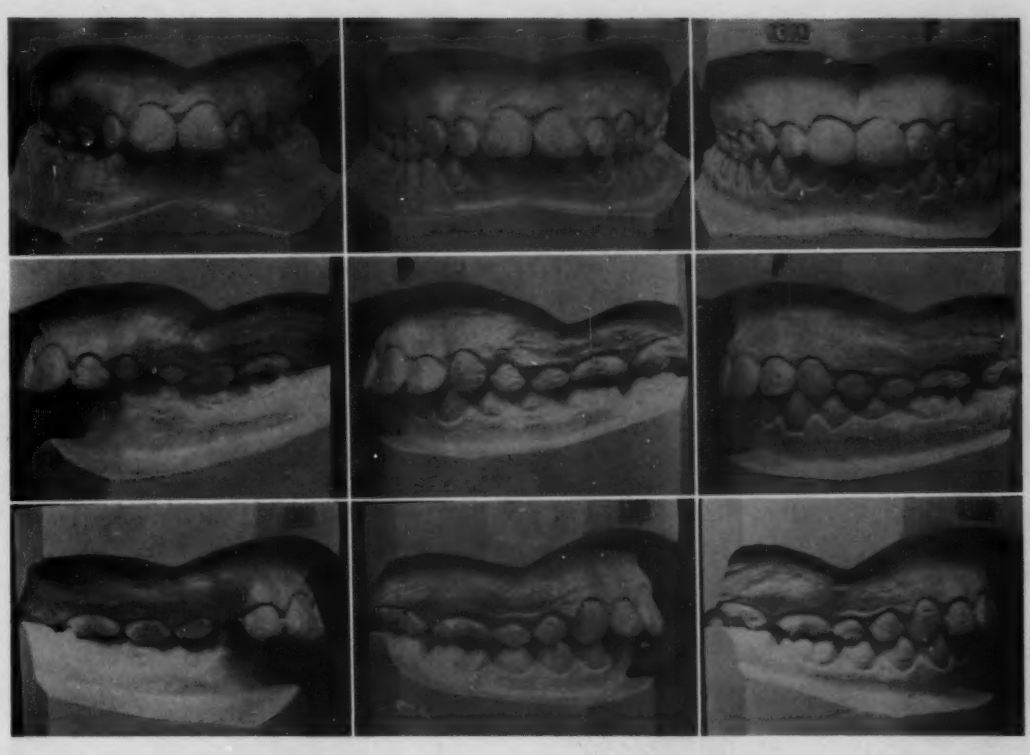


Fig. 8.—Impressions. Original, March 28, 1951; *P*, Oct. 8, 1953; *F*, April 23, 1954.

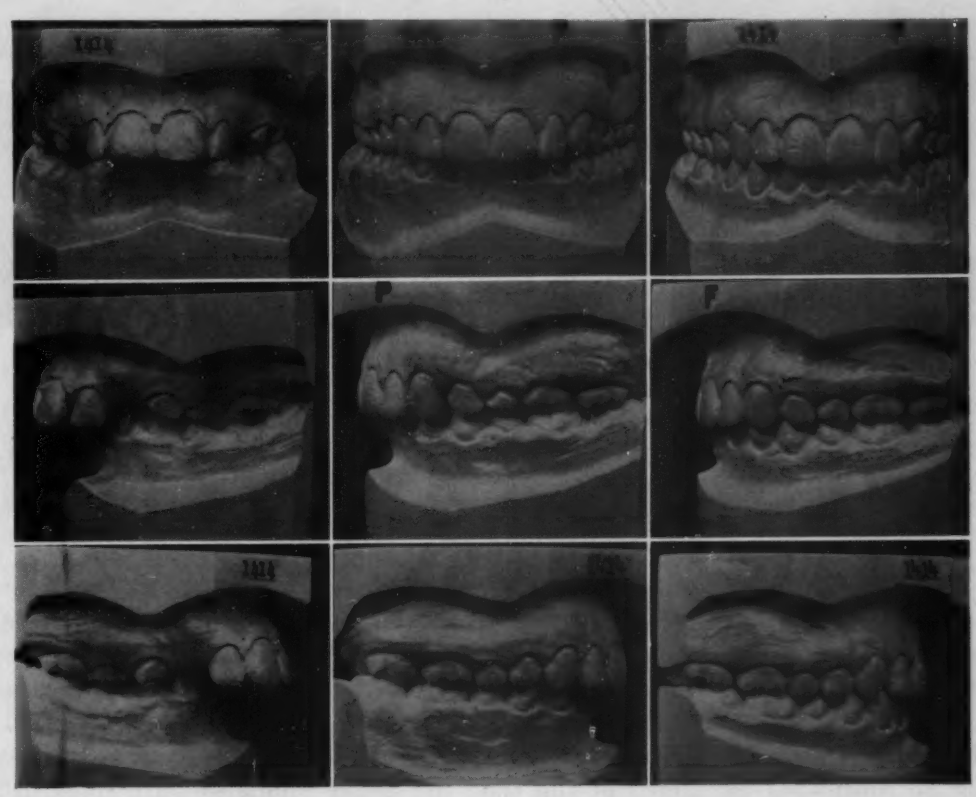


Fig. 9.—Impressions. Original, June 4, 1951; *P*, Jan. 25, 1954; *F*, April 2, 1955.

We have already seen the first case, which is shown again in Figs. 6, 7, and 8, in which the front views and right and left lateral views of the three stages are shown together on the same slide for better comparison. Fig. 6 shows the front views of the three stages, indicating that the crowding of the teeth and the locked-out canines were changed by the orthodontic treatment and, while a protrusion was present at the time the active appliances were removed, it has

Fig. 10.—Impressions. Original, April 3, 1952; *P*, Feb. 24, 1955; *PP*, Oct. 1, 1955.

completely disappeared during retention. The final result is not protrusive and, esthetically, the case is very acceptable. Figs. 7 and 8 show this more clearly, indicating that there was a general improvement during retention.

CONCLUSIONS

The evidence just presented disproves the belief that the basal bones can be too small to support the orthodontically established normal occlusion. Since, without exception, these cases all appeared to be protrusive at the end of the active treatment, such protrusions must be considered as transitional and normal for that stage. The general improvement of the occlusion and jaw relationship during retention indicates that the treatment of any orthodontic case must not be considered completed at the time the active appliances are discarded and that the method of retention is most satisfactory. It must supersede all methods of retention and retaining appliances.

This clarifies two very important points in the practice of orthodontics. First, that we must realize our limitations with the active appliances and accept the fact that they cannot improve a case beyond a certain limit and that it would be a waste of time to carry on with the treatment beyond that limit. Second, in view of the fact that the case is not completed when the active appliances are removed, we must use a retaining appliance capable of bringing about further correction. The retainers universally used at the present time will retain the condition established at the end of the active treatment, but will not allow improvements to take place.

The limit reached by an active appliance varies with the skill of the individual operator. The more meticulously the teeth are aligned, the more likely the appliance is to obtain a good result. It should be realized that the Vitallium adjuster is also limited in its ability to correct rotations. Therefore, it is important that all rotations are properly taken care of by the active appliances. There is a tendency to expect too much from the adjuster and, as a result, the active treatment may be discontinued too soon. From the results obtained in the cases just reported, we may arrive at the conclusion that the extraction of teeth for the correction of malocclusion is never necessary. We must, however, improve our technique with the active appliances and employ retainers which are capable of correcting protrusion and of holding newly established jaw relationships. We cannot escape the compelling truth that the orthodontically established protrusion is not permanent and, on that basis, the removal of teeth should never be recommended for corrective purposes. It is unbelievable that, in a nation that is willing to spend millions of dollars for the fluoridation of water supply systems for the reduction of the incidence of dental caries by 40 per cent, there should be a recommendation by the most important specialty in dentistry to extract four teeth for corrective purposes, in a very large number of cases, thus reducing the efficiency of the dentition by 12.5 per cent. When we consider that those very same patients are often advised to have their third molars removed in later years, leaving them with 75 per cent of the normal dentition, we may justly inquire whether we are rendering a really good service.

Basing my conclusions on the results that I have obtained in the fifty cases presented, I firmly believe in the preservation of arch integrity and hold without reservation that we have no moral right to extract four teeth for orthodontic purposes, notwithstanding pleadings, orders, ridicule, and even intimidation to justify the contrary. I am not in favor of destroying the beauty and fullness of the strong American face by extraction, thus creating a nation of weak-faced persons.

PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD, 1956, BY C. EDWARD MARTINEK, PRESIDENT OF THE AMERICAN BOARD OF ORTHODONTICS

Mr. President, Dr. Waugh, Fellow Directors of the American Board of Orthodontics, Members of the American Association of Orthodontists, and Guests:

The Albert H. Ketcham Memorial Award is made in recognition of notable contributions to the science and art of orthodontics. In bestowing the Award, our specialty acclaims the recipient with its very highest honor. Two of the esteemed colleagues who have received this acknowledgment in the past are with us on this platform today. I should like to introduce them to you—Drs. Alfred Paul Rogers and Charles R. Baker. Their names are familiar to all and this undertaking is made with the hope that their contributions will serve as inspiration to the younger men of our specialty.

I am certain that all of you are aware of the attainments of these gentlemen.

Today we are gathered to pay tribute to Dr. Leuman Maurice Waugh, the 1956 recipient of the Albert H. Ketcham Memorial Award. The occasion will surprise none of the orthodontists the world over who are familiar with his distinguished professional and private life, and know that he is characterized by devotion, kindness, sympathy, generosity, and scholarliness.

Three generations of Waughs have graced the dental profession. Leuman's father was a dentist and Leuman's son, Donald, is also a dentist. And who knows but that the 14-year-old grandson, Douglas, may make the fourth generation of Waughs in dentistry?

With his Scottish-Pennsylvania Dutch background and training, it is understandable that Leuman would be more "plain" than "fancy." He has had a devout love, always, for the outdoors and God's creatures.

This affection led him to many fishing and hunting trips into Ontario, Newfoundland, and Quebec's Gaspé Peninsula. Moose, caribou, polar bear, walrus, and Arctic ptarmigan were among his objectives, but the weapon was his camera. Donald has accompanied his father on many of these journeys and apparently shares the same conservationalist interest in forest and stream.

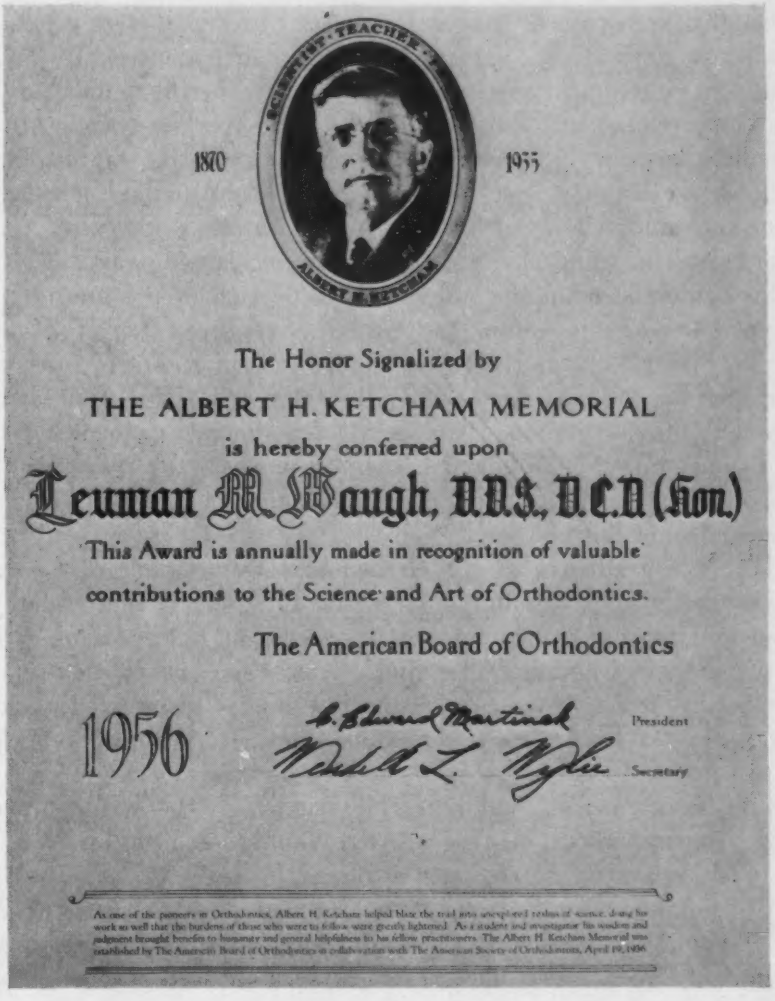
His "forest primeval" is now on Maryland's eastern shore of Chesapeake Bay. There Dr. Waugh drives his tractor-mower with reckless abandon over his spacious lawn and devotedly cultivates a budding vineyard and fruit orchard. In the off-season he is busy photographing thousands of wild ducks, Canada gray geese, and swans that winter in the vicinity.

He is a religious man, and Sunday will always find him and his family in church.

Among his special interests and delights are visits with his old friend, Joe Eby, on the Maryland countryside.

Upon graduation from the University of Buffalo in 1900, *summa cum laude,* Dr. Waugh pursued postgraduate study for three years at the School of Medicine in histology, bacteriology, and pathology.

He served as professor of histology and embryology from 1901 to 1912 and for ten years he also was professor of special pathology at the University of



THE KETCHAM AWARD

Buffalo. Six of these years he served as an officer of the Governing Faculty of the University. In 1914 he moved to New York City, limiting his practice to orthodontics.

Upon his arrival in New York, Dr. Waugh became associated with Columbia University. This continued until his forty-five-year teaching career was terminated by statutory retirement in 1945. This important chapter of his life

began with his appointment to the Organization Committee of the Dental School, Columbia University. The Dental School was established in 1917 and he was one of its founders.

For the next several years, Dr. Waugh was secretary of the Dental Faculty and professor of histology and embryology. In turn, he became acting director of the School of Dental and Oral Surgery and then associate dean. In 1921 he was appointed professor of orthodontics, chief of staff. A year later he became founder and director of the Orthodontic Department for Post-Graduate and Graduate teaching.

Although the responsibilities at Columbia University were great, especially when added to those of his private practice in orthodontics, Dr. Waugh still found time to contribute more than sixty papers to the published literature, as well as hundreds of unpublished papers. Moreover, he traveled to Labrador each summer between 1922 and 1927 with the scientific motive of studying caries among the Eskimos. Seeking to find a sufficient number of more primitive people for this study, he fixed his attention upon the Eskimos in Alaska. The particular area in which he was especially interested was the Kuskokwim Basin, this being the populous and primitive portion of the territory. Despite the inaccessibility of this section, Dr. Waugh adventured there for five summers between 1929 and 1937 and further undertook the rigors of such a journey by plane one winter. At first the United States Coast Guard attempted to convey him to his destination. Not feeling that he was penetrating sufficiently deep into the country, he obtained his objective finally by traveling in his own shallow-draft boat. In this way he reached the most primitive areas where larger vessels could not go.

In 1952 the graduates of the Orthodontic Department of Columbia University assembled to pay tribute to Dr. Waugh for his services in behalf of the school and in acknowledgment of the fact that hundreds of orthodontists have received their training under him. It was natural that his close friend, Dr. Joseph Eby, was selected to give the testimonial address. In that address, Dr. Eby said: "I have always contended that Dr. Waugh could have more irons in the fire and take better care of them than any person I ever knew."

One of these "irons" had a terrific impact on the whole broad field of dentistry. It came about because of Dr. Waugh's conception of a unit type radiographic apparatus in compact form to be used in a dental treatment room. He designed and had the first one made in 1915 by the Waite and Bartlett X-ray Manufacturing Company for use in his own office. Other dentists quickly recognized the value of the unit and its manufacture and distribution were spontaneous.

These units were immediately accepted and it is possible that some of them are still in use. Later the General Electric Company sent representatives to his office for inspection and consultation. Still later, the Ritter Company sent an electrical engineer to him and decided to engage in the manufacture of dental x-ray units.

The accomplishments of Dr. Leuman Waugh have been well noted. He is a fellow of the American College of Dentists, a diplomate of the American

Board of Orthodontics, recipient of the Jarvie Medal and Fellowship in the Dental Society of the State of New York. In 1948 the University of Montreal distinguished him as honorary professor and four years later conferred upon him the honorary degree of D.C.D. He is also a member of Omicron Kappa Upsilon, honorary fraternity in dentistry, and Sigma Xi, honorary fraternity of the sciences.

The one whom we are honoring today has served as consulting orthodontist with the New York Orthopedic Dispensary and Hospital; consultant in orthodontics, New York Infirmary for Women and Children; member of the Dental Advisory Board of the Department of Health of the City of New York; member of the Dental Advisory Committee of the New York Tuberculosis and Health Association; chairman and organizer of Advisory Committee on Orthodontic Care, Department of Health of the State of New York and also of the City of New York. He has also been dental director (reserve) of the United States Public Health Service in Washington, D. C., and dental consultant to the Indian Service, Department of Interior, Washington, D. C.

He is a charter member of the International Association for Dental Research, a member of the European Society of Orthodontists, and was honorary president of the Second International Orthodontic Congress in London, England. He is a founder of the Northeastern Society of Orthodontists and is an honorary member of the Southern Society of Orthodontists. He is also past president of the American Association of Orthodontists. During the emergency of World War I he was treasurer of the Preparedness League of American Dentists. He was director and treasurer of the William J. Gies Foundation for the Advancement of Dentistry. He has served as director and president of the American Board of Orthodontics.

His associations with organizations outside of dentistry are numerous. He is a member of the New York Academy of Medicine; the American Geographical Society; the American Museum of Natural History; the Metropolitan Museum of Art; the National Geographic Society; the Columbia University Club; the Camp Fire Club of America, of which he was President 1945–1947; and a thirty-second degree Mason. He is a Fellow of the American Association for the Advancement of Science; the International Grenfell Association, of which he is a director; the Explorers Club; and commodore of the Yachting Department, New York Athletic Club. To add to this, he is a member of the Winged Foot Golf Club. These are but a few of his outside activities.

The attainments listed in this address would have been impossible without the interest, encouragement, and help of a wife whose objectives and enthusiasm were on the same level of enlightenment. In his wife, Helen, his inspiration was matched. In a way the present moment is a tribute to both.

As president of the American Board of Orthodontics, and acting in its behalf, as well as for the American Association of Orthodontists, it is now my honor to present to you, Dr. Leuman Maurice Waugh, the certificate attesting that you are the recipient of the Albert H. Ketcham Memorial Award for the year of 1956.

RESPONSE BY LEUMAN M. WAUGH TO THE PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD

Mr. President, Members of the American Board of Orthodontics, Fellow Members of the American Association of Orthodontists, Ladies, and Gentlemen:

In accepting this Award, I am conscious of a deep sense of humility. I was present at that momentous executive session in 1930 when Dr. Ketcham presented the final resolution for the sanctioning of the American Board of Orthodontics. His presentation met with heated opposition but, after much midnight oil had been burned, the resolution was passed. It is said with pride that I, with other members on this platform today, supported Dr. Ketcham from the first. He was a forward-looking and much respected leader. Most appropriately, after his passing, the Board, in collaboration with the American Association of Orthodontists, established this memorial for him. In reviewing the names of the fifteen colleagues who were honored previously, I cannot help but wonder if I really belong among them. However, the Board and the Association have so elected and I am deeply grateful. I assure you all that I shall, with still greater zeal, dedicate myself to exemplifying the high ideals for which the Award stands.

Our president has alluded somewhat humorously to my tyro efforts in lawn care, orchard, and vineyard cultivation. I must admit that this is a somewhat new hobby, although I have always had a keen interest in lawns, shrubs, and flower beds. My mother's people were farmers and I may have inherited a "sense of humus" which has lain dormant until now. However, my swing to fruit and grapes is not tainted with a desire to produce a new vintage or to foster the "grapes of wrath."

The cultivation of hobbies, especially in the out-of-doors, has always been one of my policies. My adventures have been mostly in the wilderness by land and sea. While I enjoy rod and gun, I have preferred to do nearly all my shooting with a camera. Game has been taken with gun only when food was needed. In finding a country home, we did so where the wilderness comes to us, as we have literally tens of thousands of wild ducks, Canada gray geese, and trumpeter swans which fly down from their nesting grounds in the Arctic and the Far North to winter in our county from about Thanksgiving to Easter. The Eastman Kodak Company has paid larger dividends because of this and we have secured some treasured reels of Kodachrome.

Our president also refers to the fact that the Waugh clan is in the third generation of dentists, with the possibility of a fourth. Should my grandson choose orthodontics as his profession, it would please me very much. I have been an orthodontist at heart since before I entered dental school, as my father

urged that I learn everything possible about straightening teeth. While a junior I began the treatment, or perhaps I should say the mistreatment, of patients. My very first case was that of a classmate who sought my care. Fifty-two years later at a class reunion dinner, he proudly showed me his mouth. All his teeth were in place and in good function, with gums healthy and anterior teeth in acceptable alignment. Believe it or not, I widened his upper arch and aligned the anterior six teeth, the lateral teeth having been locked to the lingual, by using an Angle E arch and silk ligatures.

LEUMAN M. WAUGH

In teaching and in the practice of orthodontics, I have found such deep satisfaction that I wish I could be starting all over again in the light of present knowledge and the happy promise of helpful research findings. No matter how green my garden or how thriving my vineyard, I shall never be able to set aside my interest and pride in the continued advancement of orthodontics. And may I congratulate our younger members on the firmer biologic foundation upon which to base their practice procedures.

The pioneers in orthodontics were inspired by their leader, Edward H. Angle, to "reach for the stars" in their effort to develop the most nearly ideal occlusion possible, and rightly so. This was over a half-century ago. No

group in dentistry ever labored with greater devotion than they. Orthodontics then was a new specialty and had to prove its worth—to dentists, to the health professions, and to the public. At first its appeal was mainly of a cosmetic nature and parents had their children's teeth "regulated" to improve appearance, this service being sought mostly by the wealthy. This was before income tax made prosperity a source of suspicion.

Forty-five years of teaching and fifty-six years of practice prompt me to urge all of us to be adaptable to change. Each decade seems to bring some new concept to orthodontics. We must choose the best of the new to be added to the best of the old. This decade's new concept, in my opinion, is being largely determined by public enlightenment and by our national economy.

With the passing of the years and the missionary work of the orthodontist, the public has been impressed with the fact that this service is primarily a health measure, that teeth in normal occlusion are more efficient in mastication, are more easily cleansed, last longer, and look better, and that standards of health and of beauty go hand in hand. The benefits of orthodontic treatment have broadened public appreciation and greatly increased public demand. At first, it was largely restricted to the well-to-do; now it is sought and, yes, even demanded, by the middle-class and low-income groups. We must recognize this and so modify our objectives that they too can give their children the benefit of orthodontic service when truly needed for health, for appearance, and for success in life. To this end, we should wisely apply the rule: "Strive for the ideal; studiously compromise for the practical."

The length of time needed in complicated cases treated for near-ideal results, with its consequent high cost, makes it impossible for very many worthy children to have such health care. For those who can afford it, we should continue to "strive for the ideal" just as much as our consciences dictate and the family desires. But if orthodontics is as beneficial a health service as we tell ourselves it is, we must zealously endeavor to provide such care for future generations of all classes. The two essential factors are: (1) early care, which can be accomplished only with the sympathetic cooperation of the competent general practitioner in dentistry, and (2) determination of a compromise treatment when economic conditions demand. This latter must provide efficient occlusion and a pleasing facial contour within the limits of the family budget.

The satisfactory experience in the Departments of Health of the State and of the City of New York over the past ten years has been attracting the interest of similar public health agencies in providing means for the care of indigent and semi-indigent children who have crippling and handicapping conditions. A quotation from Phillips Brooks seems in point here: "He who helps a child helps humanity with an immediateness which no other help given to human creatures in any other stage of human life can possibly be given again." It would seem to be sound economy to make an investment in treatment at this stage of development that will assist a handicapped child to become a self-supporting adult and to lessen the possibility of his becoming a public charge later in life.

I also want to thank our president for having referred to the cooperation that I have always received from my wife. Whenever additional assignments, professional or otherwise, were contemplated, we discussed them together. Never once did she fail to approve any work that I wanted to undertake and so we served as a team working in full accord, she being burdened with the trying details. I am happy to acknowledge here that what I have contributed during the past twenty years could not have been done without her devoted and competent help.

In closing, may I stress my hope that, with the improved opportunity for the education of specialists, with increased facilities for research applicable to the solution of orthodontic problems, with a better understanding of the possibilities and the limitations in treatment, with increased financial support by public health departments and philanthropic agencies and especially with a more practical approach by the orthodontist to the status of the family income, forthright orthodontic care may soon be made available to all who need and seek it.

Editorial

PROPOSED REQUIREMENTS FOR ADMISSION TO THE AMERICAN ASSOCIATION OF ORTHODONTISTS

AS FAR back as World War I, the number of orthodontists who attended each annual session of the American Association of Orthodontists was less than 100. At the Boston meeting in May, 1956, however, it was reported that 125 new members had affiliated with the A.A.O. during the current year, which reflects the fact that orthodontics as a specialty is growing in numbers at a rapid pace. During and after the World War I era of orthodontics, there were a number of things that changed, particularly in regard to orthodontic education, and dental schools gave the subject more attention. The "new look" no doubt was largely due to the fact that orthodontic specialists, in the short space of a few years, were attracting much attention in both the medical and dental professions as a result of some spectacular corrections that they were making on the faces of children. Orthodontists at that time were coming largely from the ranks of the dental profession; they were men who previously had been engaged in the general practice of dentistry and later decided to become specialists in orthodontics. Now the routine is different. The bulk of orthodontic students obviously emerge from the ranks of recent graduates who have earned a D.D.S. degree, and then promptly continue their special training without interruption at the graduate orthodontic school level; many seek an M.S. degree. After these students have enjoyed several years in the exclusive practice of orthodontics, including an accredited graduate course, it is then presumed that they have gained sufficient training and experience to be regarded as specialists.

Nowadays orthodontics is popular, and so are science and engineering.

The colleges have much to say about humanities in education, but in reality, from the outside looking in, it seems that most young people are really being trained for a job in order to make a living and not educated to think things out for themselves. Orthodontists are trained as a specialized professional group, and after such training they are presumed to be able to do a skillful specialized job in the correction of malocclusion of the teeth. Times have changed again, however, and we hear less about genes, chromosomes, histology, biology, physiology, and anatomy, but much more about acceleration and measurement of the growth of the head and much about mechanical things designed for the purpose of recording or accelerating growth and devices for correcting malocclusion of the teeth.

One thing is certain: the viewpoint now is popular that skillful clinical orthodontists require much experience and guidance by experienced hands, the same as does an intern in a hospital in order to insure that his training is complete and basically sound. That is one of the important reasons so often heard as to why so many members of the A.A.O. insist that some controlled and regulated type of preceptorship education be included as a part of the requirements for membership in the A.A.O. Many of wide experience in orthodontics maintain that there is no substitute for clinical experience in the correction of malocclusion of the teeth, formal and college training notwithstanding. Like training in instrumental music, there is no by-pass for practice.

Here is what happened over a period of some months before and after the passing of the so-called 1,500-hour requirement for membership in the A.A.O. Following the passing of the 1,500-hour requirement (university orthodontic training amendment) in San Francisco at the A.A.O. meeting in 1955, a committee to consider additional or other requirements for membership in the A.A.O. was appointed. This committee consisted of Ernest Bach of Toledo, Ohio, George W. Hahn of San Francisco, California, and Andrew F. Jackson of Philadelphia, Pennsylvania, with John W. Thompson of Chicago, Illinois, and Brooks Bell of Dallas, Texas, as cochairmen. At the annual A.A.O. meeting in Boston in May, 1956, this committee recommended the following amendment to the constitution, which was presented at Tuesday's business meeting and unanimously approved for proposed action at the New Orleans meeting to be held in 1957. This will be voted on in New Orleans.

The amendment is as follows:

SECTION 2. ELIGIBILITY OF ACTIVE MEMBERS.

(A) A person who is in the exclusive practice of orthodontics* and who is a member in good standing in his local, state, and national dental organizations may be elected to active membership through his constituent society, provided the applicant has been:

1. Five years in the exclusive practice of orthodontics, including a successfully completed orthodontic course of a minimum of 1,500 hours in an approved dental school. The applicant must be recommended by two active members of the constituent society within the jurisdiction of which he intends to practice.

or

2. Five years in the exclusive practice of orthodontics, at least three consecutive years of which shall have been in the office of, and in full-time association with, a practicing member of the American Association of Orthodontists. This practicing member shall have been an active member of the American Association of Orthodontists for not less than eight years. The applicant must be recommended by two active members of the constituent society within the jurisdiction of which he intends to practice.

(a) Notice of the inception of this associateship shall be forwarded within thirty days to the secretary of the constituent society of which the senior associate is a member. The senior associate, who shall act as a preceptor to the junior associate, shall inform the secretary of his constituent society of the completion of the three years of associateship.

*Exclusive practice as used in these By-Laws shall mean that the member shall not engage in any type of practice other than that traditionally associated with the practice of orthodontics.

(b) Should this associateship be unavoidably terminated, the junior associate may apply for special consideration directly to the Admissions Committee of the constituent society within whose jurisdiction he practices.

3. The Admissions Committee of the American Association of Orthodontists shall consist of the director from each constituent society. This committee will establish uniform rules under which the Admissions Committee of the constituent societies shall operate.

The chairman of this committee shall be appointed by the president.

All applications for membership in the American Association of Orthodontists prior to the 1957 meeting in New Orleans are subject to membership requirements in existence previous to that date.

The preceding circumstances, then, seem to add up to the fact that a separate committee, over a period of many months, worked long and hard to try to come up with a plan that they can recommend for candidates for admission to membership (sans 1,500 hours) into the A.A.O. The committee wanted a plan that is fair and just and one that will provide evidence of competency for practice as well as of scholastic hours earned, in order to become a member. The 1,500-hour amendment is now passed and in effect; however, the new amendment presented in Boston proposes to remedy an important missing link in the 1,500-hour amendment and still not lower real requirements for admission.

The new amendment introduced in Boston in May, 1956, adds that those who have had *preceptorship training only* may join the A.A.O., *provided the preceptorship training is properly controlled and regulated.* Particularly is this view reconciled when the Council on Dental Education of the American Dental Association calls attention to the fact that as yet that body now has no specific philosophy adopted in regard to specialized training in orthodontics. The council does, however, make it clear that its requirements relative to recognition as a diplomate of any specialty board call for two years at the graduate or postgraduate level—and that means all of the specialties.

This makes it plain that, in the final analysis, it is the Council on Dental Education of the A.D.A. that will have the say-so as to what constitutes real specialist education in America in all the specialties in dentistry, and that will be official and according to the "rule book" as viewed by official organized dentistry. The preceptorship amendment as recommended and introduced at Boston will be voted upon for acceptance or rejection in New Orleans in May of 1957. Acceptance of this amendment will mean that the A.A.O. will still maintain very high membership requirements. Rejection of it will again make the entire organization vulnerable to criticism by those who would try to make it appear that the A.A.O. is not so much interested in extending its services to broader areas of childhood as it is in further withdrawal away from organized dentistry, as a group—bent on separating itself from the mother profession.

H. C. P.

The Fifty-second Annual Meeting of the American Association of Orthodontists

ONE PHASE OF THE BOSTON MEETING OF THE A. A. O.

NOT too long ago, the annual sessions of the American Association of Orthodontists were made up of a mere handful of men; almost any city and hotel (even Excelsior Springs, Missouri) was able to take care of the physical requirements of the group. Nowadays, however, any city that entertains this rapidly growing group must have ample hotel facilities for 1,200 to 1,500 people, and a large auditorium. Clinic facilities and space for dinners that can seat the large majority of the group all at one time are musts.

Orthodontics being what it is, the clinic department alone has grown so large that it is difficult to see even a section of the clinic. The commercial exhibits have now grown, in twenty-five years, from practically nothing to an elaborate layout, and they must be right in the middle of convention traffic if the exhibitors are to be pleased with their space.

The Boston group handled this large crowd with amazing dispatch, with everything under one roof at Boston's Statler Hotel.

This over-all growth situation, under the able leadership of Dr. Phil Adams, led to much talk about setting up an organizational plan, the basic design and operation of which would tend to relieve the local group in any city of starting from scratch each year to organize this great meeting. The Boston meeting impressed us with the growth situation as never before.

Boston had a fine organization; that is, again, why it has been suggested that at least a part of the Boston plan and blueprint be published in order that it may serve as a kind of reference organizational chart for future local committees.

Another suggestion has been made this year that may be helpful to future committees; that is to publish at least a digest of the programs of the annual meeting from year to year so that it may be available for ready reference, even years in the future, if desired.

The following is the committee plan for the Boston meeting this year, as kindly provided on request by Henry C. Beebe, Chairman of the Local Arrangements Group:

LOCAL ARRANGEMENTS

Henry C. Beebe, Chairman
Walter J. Sly, Treasurer
Philip E. Adams
Everett A. Tisdale
Edward I. Silver

1. Responsibility, at local level, to organize the meeting.
2. Prepare tickets for social functions, clinics, etc.
3. Distribution of tickets.
4. Gather information on local interests such as eating places, golf courses, tours, museums, etc.
5. Collaborate with Chamber of Commerce regarding help, typewriters, pamphlets, and publicity.
6. Supervise subordinate committees.
7. Cooperate with A. A. O. officers and those of Northeastern Society.
8. Selection of menus, properties, etc.
9. Cooperate with Statler Hotel.
10. Provide rooms for breakfasts and luncheons of committees, such as Editorial Staff and Publication Board, Sectional Secretary-Treasurers, A. B. O., etc.
11. Secure projectors and operators, badges and holders, applications, etc.

Registration

Maynard E. Cohen, Chairman
Franklin A. Squires
I. D. Davis
Frank Gilley
Irving Grenadier
Orville L. Hankins
David Mossberg
John J. Murray
Donald D. Osborn
Sidney Shapiro

1. Arrange all aspects of registration.
2. Brief committees on various categories besides members and associates.
3. Liaison with secretaries' desks.
4. Liaison with Credentials Committee.
5. Distribute badges.
6. Clear registration cards.
7. Assist treasurer with cash and cash boxes.
8. Provide current file of members.
9. Provide girls from Chamber of Commerce.
10. File cards after they have been filled in by members.

Reception

Fred R. Blumenthal, Chairman
George C. Brown
Joseph K. Gold
Willis H. Grinnell
Norman L. Hillyer
Raymond L. Webster

1. Receive members.
2. Give information.
3. Work with Information Committee.
4. Have member present at A. A. O. registration desk on various days.
5. Pool resources with Information, Registration, and Reception Committees.
6. Have someone present at the Hotel Statler registration desk.

Information

C. Paul Bonin, Chairman
Albert F. MacDougal—Maine
William W. Fraser—New Hampshire
Lewis H. Shipman—Massachusetts
Francis M. Schneider—Connecticut
William A. Morinville—Rhode Island
J. Edward Marceau—Vermont

1. Provide maps, information on eating places, points of interest, golf courses, etc.
2. Appoint someone from Chamber of Commerce to man desk.
3. One or two members on duty Sunday and Monday.
4. Assign personnel at strategic points.

Clinics

Milton J. Meyers, Chairman
Melvin I. Cohen
Alfred Jaffe
Warren R. Mayne
Bernard C. Rogell
Everett Shapiro
Lyndon M. Virkler
Ben Wayburn
Herman Livingston
Charles Goldthwaite
George Gales

1. Appoint subcommittee, designated as Properties Committee.
2. Plan physical arrangement for clinics.
3. Provide checkers at Limited Attendance Clinics.
4. Distribute floor plans, synopsis, etc.
5. Provide operators for projectors.
6. Introduce speakers in various rooms.
7. Responsible for properties in various rooms.
8. Provide property room with plug key.
9. Check on blackboards, water, pointers, ash trays, outlets, etc.
10. Watch time!!

Ladies' Entertainment

Robert M. Bailey, III, Chairman
Mrs. Robert M. Bailey, III
Mrs. Philip E. Adams
Mrs. Sidney Asher
Mrs. Walter R. Bedell
Mrs. William W. Fraser
Mrs. Clifford G. Glaser
Mrs. Norman L. Hillyer
Mrs. Oscar Jacobson
Mrs. Eugene J. Kelley
Mrs. Richard A. Lowey
Mrs. Albert F. MacDougal
Mrs. William A. Morinville
Mrs. C. Edward Martinek
Mrs. Henry C. Beebe
Mrs. Milton J. Meyers
Mrs. Lowrie J. Porter
Mrs. Wilbur J. Prezzano
Mrs. J. A. Salzmann
Mrs. Francis M. Schneider
Mrs. Earl E. Shepard
Mrs. Edward I. Silver
Mrs. Walter J. Sly
Mrs. Franklin A. Squires
Mrs. Brainerd F. Swain
Mrs. Everett A. Tisdale
Mrs. Raymond L. Webster
Mrs. William L. Wilson

1. Supervise Continental Breakfasts.
2. Assign hostesses for various days.
3. On day of Fashion Show provide hostesses at both hotel and University Club.
4. Hosts at registration.
5. Provide hostesses on buses on Historical Tour and to Ladies' Luncheon.

Get-Acquainted Dinner

William L. Wilson, Chairman
Harold Nice
Emory H. Farrington
Harry Perkins

1. Line head table.
2. Discuss question of introductions.
3. Line-up for entrance.
4. Place cards for head table.
5. Microphone and flowers.
6. Table seating arrangement.

Banquet

Everett A. Tisdale, Chairman
Lowrie J. Porter
Walter Bedell
Donald D. Osborn

1. Place cards.
2. Head table arrangement.
3. Head table line-up for entrance.
4. Introductions—society presidents, etc.
5. Foreign members.
6. "High spots" of meeting about to conclude.

PRESS

Jacob Salzmann, Chairman — Earl E. Shepard
H. C. Pollock — Warren Mayne

1. Provide room for press (Parlor F).
2. Arrange interviews with member of Committee present.
3. Prepare releases.
4. Arrange press hours.
5. Provide sandwiches and refreshments for press.
6. Have synopses of essays ready for press.

COMMERCIAL EXHIBITS

Sidney Asher, Chairman — Henry Kaplan
Norman Cetlin — Lawrence Pearlman

1. Committee present all day Sunday.
2. Acquire aid from the hotel in setting up exhibits.
3. Set closing time, if necessary.
4. Provide police and fire protection.

It is understood that the matter of a plan for future meetings was discussed by the Board of Directors, with favorable reaction.

H. C. P.

THE GET-ACQUAINTED DINNER

The Get-Acquainted Dinners, which have become an important part of the annual meetings of the American Association of Orthodontists, are enjoyable and pleasant occasions which seem to have supplanted the traditional stag dinner popular for so many years as the "kick-off" of the annual meetings. This year's Get-Acquainted Dinner was held in the Georgian Room of the Statler Hotel in Boston on Monday, April 30, at 7:30 P.M., with about 580 persons in attendance.

At the head table were the presiding officers of the American Association of Orthodontists and of the Northeastern Society of Orthodontists, the president of the American Board of Orthodontics, and nonmember guest lecturers.

The festivities subsequent to the dinner were ably and skillfully directed by Chairman William L. Wilson, who introduced the speaker of the evening, Mr. Alton Hall Blackington. Mr. Blackington, a noted lecturer on the folklore and traditions of New England, has been known for many years as a lecturer on radio and television and as the author of several books on Yankee yarns. The evening's entertainment was conducted on an informal basis with the intent of providing a feeling of local color.

The Northeastern Society of Orthodontists were the hosts for the cocktail hour which preceded the dinner.

ATTENDANCE AT A. A. O. MEETING

THE following is the run-down of the record of attendance at the Boston meeting of the American Association of Orthodontists in May. This information was provided by the Local Arrangements Committee.

Active members registered	538
Full-time university dental school teachers	15
Full-time graduate or postgraduate students in university orthodontic departments	73
Dentists from outside Canada or United States and members of recognized dental or orthodontic organization	3
Associate or junior members of constituent societies of A. A. O.	67
Recent graduate of university orthodontic department	1
Recent graduates, not members of constituent society of A. A. O.	34
Certified by Credentials Committee	64
Unclassified guests	6
Guest clinicians	6
Total registration	807
Ladies registered	257
Exhibitors registered	66
Total registration	1,130

REPORT ON THE GOLDEN ANNIVERSARY LUNCHEON

THE Golden Anniversary Luncheon at the American Association of Orthodontists meeting in Boston again made an outstanding contribution to our program and constituted a well-deserved tribute to all A. A. O. members who have been in the practice of dentistry for fifty years or more. The following Golden Anniversary Group members were present and seated at the head table:

Alfred P. Rogers
Charles R. Baker
Robert H. W. Strang
Oliver W. White
Alfred M. Desnoes
Arthur V. Greenstein
A. F. Jackson
Walter H. Ellis
Leuman M. Waugh
Hugh T. Berkey
William W. Leslie

The total attendance at this luncheon was 303, which is the largest since its inception in 1954.

This luncheon featured three speakers, the main speaker being Alfred P. Rogers, who was introduced by Leuman M. Waugh. The chairman of the Luncheon was our A.A.O. vice-president, Stephen C. Hopkins, who made some most interesting opening remarks before introducing Dr. Waugh.

All three of these talks were of such value that they are presented here so that you may read and seriously ponder over their contents.

Remarks by Stephen C. Hopkins

It is fitting that we pause a moment on occasions such as this to pay tribute to our pioneers. In order to be lasting and worth while, *anything*—a building, a country, or a profession—must rest upon sound foundations. Our profession has been, I might say, uniquely favored by our pioneers, many of whom are members of this Golden Anniversary Group. What they may have lacked, in the beginning, of present-day scientific knowledge, together with the accumulated results of research, clinical experience, appliance refinements, and so forth, they more than made up in enthusiasm, native ability and, most of all, in the capacity for just plain hard work and "stick-to-itiveness." So this Golden Anniversary Luncheon was conceived to honor those of us who graduated fifty years or more ago and specifically, this year, to honor those who have just reached that lofty pinnacle. A few words about the history of this Luncheon. The idea originated in the fertile brain of Ernie Bach, who was the first chairman at Brooks Bell's meeting in Dallas in 1953. I have a notion that "Brooksie" started figuring that he was approaching the half-century mark when he ap-

pointed Ernie, Bill Humphrey, and Lowrie Porter as the committee for this meeting! That year there were thirty-six members, nine of whom attended the luncheon.

In 1954, in Chicago, the number of members of the Golden Anniversary Group rose to forty-four, twenty-six of whom were still in active practice and fifteen of whom attended the luncheon. The committee was composed of Charlie Baker, Raymond Curtin, and Lowrie Porter.

In 1955, in San Francisco, five new men became eligible, bringing the total membership to forty-nine. The Golden Anniversary Group then became, very appropriately, the "Forty-Niners." Only three of the group were able to attend. Bobby Strang gave a noteworthy talk, outlining the history of orthodontic practice and in the end exhorting his fellow members as follows: ". . . let us never be depressed because the years are flying by, but let us continue to meet the demand of service with vigor, fortitude, and confidence."

Upper row, left to right: William W. Leslie, Charles R. Baker, Oliver White, Arthur V. Greenstein, Hugh T. Berkey, Stephen Hopkins (chairman, but not eligible for the 50-years-of-practice qualification).

Lower row, left to right: Alfred M. Desnoes, Andrew F. Jackson, Robert H. W. Strang, Walter H. Ellis, Leuman M. Waugh, Alfred P. Rogers.

This year we have three new members—James David McCoy of Beverly Hills, California; Sydney Wood Bradley of Ottawa, Canada; and Ralph Waldron of Newark, New Jersey. The total membership would therefore have been fifty-two, but unfortunately five of our members had a greater calling during the past year, which makes our membership forty-seven. As usual, each of this year's new members has made important contributions to the profession. Two of them are past-presidents of our organization and the other, Dr. Bradley, has been president of about everything in Canadian dentistry. We are sorry that they are unable to attend.

The Committee on Arrangements for this luncheon has consisted of Robert H. W. Strang and Walter Ellis, with Charles R. Baker acting as chairman.

Dr. Hopkins then introduced Dr. Waugh, who, in his introduction, spoke as follows:

Mr. Chairman, Fellow Exhibits of Antiquity, Ladies, and Gentlemen: The privilege of presenting our speaker is deeply appreciated. His qualities of character, his eager and gentle greeting of life, and his sincere devotion to the highest ideals of ethics make him a man whom one cannot help but admire and respect. We have been close friends for many years, the consciousness of which is a much treasured possession. To know him is to love him.

The time allotted is brief. Therefore, I shall review only a part of his most outstanding attainments, so that we may have ample time to enjoy his address.

Education:

Acadia University, Wolfville, Nova Scotia
University of Toronto, Royal College of Dental Surgeons, 1893-1894
Pennsylvania College of Dental Surgery, D.D.S., 1896
Angle School of Orthodontia, 1903
A.M. (Hon.), 1920; D.Sc. (Hon.), 1944, Acadia University
D.Sc. (Hon.), 1941, Washington University
American Board of Orthodontics, 1930
Recipient of Albert H. Ketcham Award, 1938 (the second to be so honored)

Career:

Selected general dentistry first; ten years later, recognized the need for specialization and limited practice to orthodontics
Associate professor of orthodontic research, Harvard University, 1918
Director of Harvard-Forsyth Postgraduate School of Orthodontia, 1919-1922
Associate in orthodontia, Harvard University, 1927-1940
Clinical professor of orthodontics, School of Dental Medicine, Harvard University, 1941-1943
Member of Administrative Board, School of Dental Medicine, Harvard University, 1944-1945
Guest lecturer, Department of Orthodontics, School of Dental and Oral Surgery, Columbia University, 1932-1945
Past-president, American Academy of Dental Science, 1915-1916
Past-president, American Association of Orthodontists, 1911
Past-president, Northeastern Society of Orthodontists, 1928-1929

Member of:

American Dental Association
Massachusetts Dental Society
Eastern Association of the Angle School of Orthodontia
Fellow of the New York Academy of Dentistry
Fellow of the American College of Dentists
American Association for the Advancement of Science
Northeastern Society of Orthodontists
American Association of Orthodontists
American Academy of Dental Science
Omicron Kappa Upsilon, 1941
Harvard Odontological Society (Hon.)
Honorary life member of Toronto, Canada, Study Club (Ortho.)
European Orthodontological Society (Hon.)
Harvard Dental Alumni Association (Hon.)

Clubs:

Harvard Club of Boston
St. Botolph Club of Boston

Other Activities:

Reforestation
Certified Tree Farmer
Charter member of American Tree Farm Association
(He owned a country home of large acreage in New Hampshire, which he had reforested many years ago. He has keenly enjoyed the promising growth of his "forest." This has recently been taken over and will be under the care of trained foresters. It will be known in perpetuity as the Alfred Paul Rogers Forest.)

Hobbies:

Woodworking
Gardening
Ornithology

Author of:

Numerous professional papers
Articles on reforestation, conservation, and country life.

A number of our younger members may not have met our speaker in person, but I know that all students of orthodontics have known him in the literature. In 1918, at our annual meeting, he presented a paper entitled "Muscle Training in Its Relation to Orthodontic Treatment." Later he added to this under the title of "Living Orthodontic Appliances" and, still later, as "Myo-functional Therapy." He also produced an enlightening color movie illustrating various corrective exercises to be taught the patient for use during and after treatment.

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Member of:

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Eastern Association of the Angle School of Orthodontia
Fellow of the New York Academy of Dentistry
Fellow of the American College of Dentists
American Association for the Advancement of Science
Northeastern Society of Orthodontists
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These contributions were very helpful and have added much to the perspective and progress of orthodontics. The application of the principle of function as related to structure, especially in the formative years, is an essential part of forthright treatment on the sound physiologic principle that normal function is conducive to normal structure which largely determines adult form.

His contributions to the science and practice of orthodontics have been basic, and his name will live on after most of us have been forgotten.

It is interesting to note that this is the first meeting of the American Association of Orthodontists to be held in Boston since Dr. Rogers was president in 1911. At that meeting there were less than seventy-five in attendance.

May I now present an orthodontist who has made Boston famous—our speaker, Alfred Paul Rogers.

Address by Alfred Paul Rogers

Mr. Vice-President, Members of the American Association of Orthodontists, Guests, and Distinguished Men of Long and Valuable Experience to Whom We Do Honor on This Occasion: I would like to say that I feel highly honored to have been chosen to speak to you today. I wish now to thank Dr. Waugh for his kindly introduction, but if he will pardon me, and I feel sure that he will, I would like to offer one comment. It has long been my understanding that Paul Revere was the dentist who made Boston famous, because it was he who attended to the dental problem of our first President, George Washington. Be that as it may, I am glad to have Dr. Waugh tell you about my tree-farm experience for it gives me an opportunity to reveal, especially to the men who have not known me, the source of some of my opinions in relation to orthodontics, strange as that may seem.

Many years ago, under the influence of the words of President Charles W. Eliot of Harvard University, I determined to create a forest. His words were: "To establish a forest reservation is as nearly immortal as any human work can be. It is self-perpetuating, and lasts from generation to generation."

It therefore became my absorbing experience to prepare seedbeds and plant many thousands of forest tree seeds, and to nurture them from year to year until they became strong enough to transplant among the rocky hills and abandoned pastures of an old New England farm. During the following years I watched these trees with a critical and anxious eye, and as the years progressed some of them died, others exhibited a retarded growth, and still others, with their crowns always reaching toward the sun and their roots penetrating deeply into the fertile soil, manifested unusual vigor, outstripping their neighbors. These fortunate dominant trees, in comparison with those of slow growth which were often deformed, brought sharply to my mind the fact that the dominant trees were the ones whose roots had penetrated the soil *that furnished in abundance the elements necessary for growth and development.*

Now, if you will hold this bucolic sketch in your minds, then one of the influences which cause me to express myself as I am about to do will become clear to you.

Although I have been retired now for a number of years, I have never ceased to observe and to evaluate present-day tendencies in orthodontic teaching and practice. These I like to weigh in retrospect, sometimes with a little sadness. And from these tendencies I try to gain a glimpse into the future, blending hope with imagination.

In retrospect, I am mindful of the galaxy of wonderfully talented men who laid the foundation for modern orthodontics, who brought their gifts for creative thinking into the area of clinical practice. I would not have the younger men among us today unmindful of the excellent work accomplished by their predecessors during the past half-century of research and development.

Naturally, as pioneers in the science, we made mistakes, but those mistakes simply urged us on to renewed effort and greater accomplishment. It is possible, of course, to select here and there some of the outstanding stumbling blocks that we encountered, leaving the impression that our mistakes were quite frequent and of a serious nature; but let me assure you that during that long period the men I knew well produced results in which occlusion was well established and fine oral development was secured, and that today there are thousands upon thousands of men and women who are thankful for the services that were rendered them as children. Their corrected dentofacial anomalies were, and still are, models of excellence.

My mind goes back to the month of June, in the year 1896. I remember quite clearly the day I appeared before the Board of Registration for the Commonwealth of Massachusetts. One examiner, in particular, remains sharply outlined in my mind because it was he who conducted the oral examination in clinical dentistry. Before the examination was completed, this gentleman handed me a poorly constructed model of the maxillary dental arch showing severe malalignment and his question was: "How would you regulate this set of teeth?" Having had little instruction in such matters at that early date, I was momentarily silenced. But finally, and with some hesitancy, I suggested that we extract the first bicuspids. I passed that examination!

The basis upon which our profession has built its right to be called a specialty is the concept of growth and development. We early practitioners believed, and we taught, that emphasis should be laid upon the growth of the living organism. The cynical tenet that alveolar growth was something unattainable had no place in our dental philosophy.

Rarely, for example, did we believe that it was necessary to extract bicuspids for the sake of alignment, as had been the custom once long ago. Those of us who pioneered in orthodontics lay stress upon the possibility of growth and the need for a better understanding of heredity and the psychological origin of habits, but too many, then and now, failed to take a sufficient interest in nutrition and function. We should recognize the fact that the investing osseous supporting tissue of the teeth, the alveolar process, is a functional tissue and that its cellular integrity depends upon optimum nutrition and optimum func-

tion. It is when we meet with cell starvation and occlusal trauma that we become aware of the gradual degeneration of this important tissue. Had we adopted the attitude that alveolar development was undesirable or unattainable, we need not have been interested in the biologic sciences at all.

Yet, there are those among us today who see some of their patients grow into adulthood in every aspect except that of oral and facial development. It can be said that parents are becoming increasingly alarmed over the antiquated and defeatist practice of extraction for alignment. They now can see around them adults, as well as children, who have enjoyed the benefits of skilled orthodontic procedures that have restored occlusion and produced satisfactory dentofacial development. But, even so, the heart-breaking truth remains that orthodontists trained in what they assume is the easy method are too often unprepared to satisfy those patients who may insist upon the retention of valuable teeth. In attempting to do so, their efforts too frequently end in failure. Before turning to other thoughts, I must call attention to a danger that is, in fact, a present and serious one.

Those who undertake orthodontic treatment without the advantage of adequate orthodontic training often take their cue from those who have had ample training, with the result that throughout the country many thousands of teeth are needlessly sacrificed. They are sacrificed because of the promise of a facile solution. They have made impossible the solving of problems which, with patience and skill, in the vast majority of cases, could have been corrected. I know of some classical instances of this evil. It cannot be assumed with any semblance of reason that this state of affairs should be encouraged in the slightest degree. Dentofacial anomalies are functional and structural abnormalities; yet, through the years we have one-sidedly stressed the correction of the structural alone, leaving the functional aspect to take care of itself—the nutritional aspect we have almost entirely neglected. In my opinion, it is time to re-evaluate our services as professional men and perhaps thus enhance our value to the people.

Let us now look into the years ahead and find the means whereby we may hold the dignity of a learned profession whose members are determined to be something more than stabilizers of arrested oral development. First, we must continue to consider the organism as a whole, for the human organism is an indivisible unit, and realize that oral maldevelopment and faulty facial posture are often concurrent with general faulty bodily posture; we must know also that these conditions are often predicated upon malnutrition and lack of proper muscular function. The occasional phenomenon of root resorption should have alerted us long ago. Because of instances of root resorption, we were shocked into thinking that this occurrence was due solely to faulty appliance manipulation, not realizing that the subject was predisposed and, therefore, a poor risk because of either malnutrition through inadequate diet or because of unrecognized faulty metabolism. This was made clear by the discovery of root resorption in untreated cases.

Research by a group composed of nutritionist, biochemist, and orthodontist should some day be revealing. Thus, you see, we must encourage disciplines

in various fields that will further improve our methods of clinical practice. The study of nutrition on the medical school level is, I think, imperative. In fact, as I see it, it is the ultimate solution when we think of the ever-increasing demand for orthodontic care. And, if I may be permitted to take a long-range view, why not extend this study to embrace the problem of children as yet unborn? As I consider the matter, it seems the best orthodontics possible. Why should not orthodontists try to serve future generations of children by teaching the present generation the facts of optimum nutrition, that future generations may finally develop without the present necessity of so much mechanical orthodontics? We all know the old adage: "An ounce of prevention is worth a pound of cure." Even if what I am urging seems remote, please do not think it is any the less imperative, or any the less demanding of our immediate consideration.

We talk sometimes of the difficulties of retention when, at the same time, we neglect the consideration of the nutritional status of our patient, for the surest way to encounter difficulties of retention is to allow the patient to continue in ignorance of the necessary nutritional regime. A sharp line of demarcation should be drawn between that form of treatment which is constructive in nature and that which can be termed "retrograde orthodontics." Slowly, but surely, we must gather the knowledge that will obliterate that line and learn to build truly. Nothing that is incomplete can show the full beauty of truth.

Every patient, in my opinion, should continue on a nutritional intake that includes not only a well-balanced diet, but also those elements that are known to be necessary for tissue building and repair. The idea of postponing treatment until the eleventh or twelfth year, and in the interim neglecting the nutritional requirements and the properly executed functional exercises for the purpose of developing well-nourished and healthy tissue, is, to my mind, an act of neglect of which we have been guilty throughout the years. With the knowledge and application of the newer nutrition, orthodontic procedures can and should be more rewarding to patient and clinician alike. Some of our clinical practices in use today I consider as expedients only, which should be abandoned in the years ahead because of a better understanding of a real science of orthodontics based upon the knowledge of how to prepare and improve the organic material upon which we apply our technical skills.

Many of you will remember that years ago Dr. Leuman M. Waugh brought from the Far North the message that Eskimos, prior to their contacts with the "company store," were free from dental caries and dentofacial anomalies. This one simple discovery might have taught us a lesson worth learning, but we failed to heed it. Generation after generation, our children have been growing up unmindful of the dangers that lurk in the more civilized equivalent of the "company store" in their own neighborhoods. Even if we now become sufficiently aroused over the menace of certain overrefined foods to the dental health of human beings, it may take several generations of the future to remedy the evils of past neglect and indifference.

On the slopes of the Himalayas, Dr. Robert MacCarrison discovered a race of men where dentists are not needed because there are almost no dental caries and where orthodontic specialists are absent because there are no significant dentofacial anomalies. Through heredity, optimum nutrition, and adequate function, these people attain almost perfect physical development and, with it, mental calm. Their physical troubles are, indeed, few.

It is because of such examples that I urge again that every orthodontist become competent in nutritional knowledge through serious scientific study, even if the ultimate result of his teaching—caries-free, dentofacial anomalies-free generations of children—may lie beyond the horizon of his own lifespan. His studies of nutrition can introduce him to broad areas of knowledge, beginning with the soil and with its nutritional integrity. He will need to give attention to the lures of commercialism, the false claims of the processed food manufacturers, the easy persuasiveness of the advertising hucksters—many of whom tamper with the vital facts of optimum nutrition. Above all else, he will need to insist that incorruptible men are in positions where the important decisions affecting national health are made.

Our own late Dr. Percy Howe, of the Forsyth Dental Infirmary, years ago pointed out many of these facts through animal experimentation with inadequate nutrition. Others followed him along the same lines of pursuit until today there is a growing awareness of malnutrition, not only as our problem, but as a national problem which deserves the attention of all health services and institutions, of parents, and of teachers alike. The ultimate solution lies in serious research, education, and application of knowledge, some which we now possess but little of which is used intelligently.

Thus, we seek to improve the effectiveness of the science of orthodontics in the promotion of human welfare, and endeavor at the same time to increase public understanding and appreciation of the importance of its place in the sciences devoted to human physical excellence.

Lowrie J. Porter.

Department of Orthodontic Abstracts and Reviews

Edited by
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The Estimation of Age and Sex of Preadolescent Children From Bones and Teeth. By Edward E. Hunt, Jr., and Izaac Gleiser, Rio de Janeiro, Brazil. *Am. J. Phys. Anthropol.* **13**: 479-487, September, 1955.

One of the problems which arise in the identification of a living child is the diagnosis of his chronological age from the calcification of his bones or teeth. On the basis of the dentition, three related estimates of dental age are now available. One estimate can be made from the numbers of teeth visible in the oral cavity. A second, more limited, estimate can be based on the schedule of calcification of the permanent mandibular first molar. A third estimate is based on the schedule of calcification of the dentition as a whole. The first two estimates take account of the sex of the child, whereas the third table presents dental maturation as though no sex difference occurred in its timing.

For the clinical emergence of the deciduous teeth, convenient data can be found in Robinow, Richards and Anderson (1942) and in Meredith (1946). For the permanent dentition, exclusive of the third molars, the charts of Hurme (1948) can be recommended. These standards are especially useful for American white children.

Bone age in children may be estimated by many methods. The presence or absence of osseous centers in several body regions may be noted and compared with standards such as those in Sontag and Reynolds (1945), Flecker (1942), Pyle and Sontag (1943), or Harding (1952). In the intact body, less precise, but often more practicable, methods of regional assessment may be employed. For the hand, suitable standards include those of Todd (1937), Flory (1936) and Greulich and Pyle (1950).

The determination of sex from the skeletal remains of children is difficult and uncertain. Improved diagnoses can be based on the fact that the sex difference in dental maturation is far less than that occurring in the skeleton. Concurrent estimates of dental age and bone age are made for the remains. These estimates make it possible not only to identify the sex of the skeleton, but also to improve the diagnosis of age at death.

The radiographic test is based on a lateral jaw film and a standard developmental film of the hand. On the dental radiograph, the developmental stage of the permanent mandibular first molar is recorded. For a tooth with "two-thirds of the root completed," for example, the mean age for boys would be 84.3 months (7.0 years). For girls, the estimate would be 80.7 months (6.7 years). An assessment of bone age should be made from the atlas of Greulich and Pyle (1950) on male standards, and another from female standards. In the foregoing case, if the "male bone age" were 7 years, the equivalent "female bone age" would be about 5.6 years.

Hurme (1948) published means for the clinical emergence of all permanent teeth except the third molars, and the equation computed from his means fits the sex difference in the calcification of the permanent mandibular first molar as well. Where y equals the age of girls, and x that of boys, the equation is $y = 0.95x$.

An equally simple equation for the preadolescent sex difference in skeletal maturation of the hand was calculated by using two copies of the Greulich-Pyle atlas. The male standards at or below 12 years 6 months were read from one atlas according to the female standards in the other, and the following equation of sex difference was obtained: $y = 0.80x$.

With increasing age, boys and girls diverge more rapidly in skeletal maturation than in the development of the permanent teeth.

The calcification of the permanent mandibular first molar was studied from longitudinal data on Boston white children. Dr. S. I. Pyle has also derived the skeletal age of the hand from radiographs of these children, using the Greulich-Pyle standards. The children in this series are among the group who have been investigated by members of the staff of the Harvard School of Public Health and the Forsyth Dental Infirmary for Children, under the supervision of Professor Harold C. Stuart.

Using the two least-squares formulas, the dental and bone ages for the *appropriate* sex of each child were calculated at the chronologic ages of 2, 5, and 8 years. The sex of the child was then diagnosed as the one in which the bone and dental ages agreed most closely.

Even at the age of 2 years, this method of sexing is worth the effort. Its efficiency improves with age, as might be expected from the increasing absolute divergence of skeletal and dental maturation in the two sexes.

On the average, the age of a girl diagnosed by male standards of ossification will be about 20 per cent younger than her true chronological age. When sex has been ascertained from osseous and dental maturation, it is of some interest to find out how accurate the diagnosis of chronological age will be. The ages of those "diagnosed as male" were estimated using male standards, and those "diagnosed as female" by female standards.

When the sex of a child is diagnosed from osseous and dental calcification, his chronological age can be estimated about as accurately as though his true sex were known. In general, the calcification of the permanent mandibular first molar is slightly more efficient as a predictor of chronological age than is the ossification of the hand.

From the permanent mandibular first molar alone, dental age can be estimated up to 8 or 9 years. If standards were perfected for either or both of the permanent second molars, the dental age could be determined up to 14 or 15 years.

In making assessments of dental age from skeletal remains, the problem of preservation is generally not critical, and radiographs or studies of the teeth themselves ordinarily should not be difficult. In diagnosing bone age, however, the skeleton of the hand is by no means ideal material. These bones are small and easily destroyed, and the comparison of these fragments with standards in a radiographic atlas may be virtually impossible.

For equivalent stages of development of the permanent teeth, the average age of a girl is about 95 per cent of that of a boy. For the maturation of the bones of the hand, at a given stage, a girl will be about 80 per cent as old as a boy.

On the basis of these equations, concurrent estimates of bone and dental age by male standards should agree closely if the remains are those of a boy, but should be more divergent if female standards are applied. The opposite is

usually true if the remains belong to a girl. If bone and dental ages are assessed for the remains by the standards of both sexes, the sex for which the standards agree best is considered to be the correct one.

In an unknown immature skeleton, a lateral radiograph of the jaws and an examination of osseous development make the determination of its age at death somewhat more accurate.

Textbook of Functional Jaw Orthopaedics. By Karl Häupl, M. D., Professor of Dental Surgery, University Dental School, Innsbruck, William J. Grossman, M.D., L.D.S., R.C.S., Orthodontic Consultant and Lecturer in Orthodontics, University College Hospital Dental School, London, and Patrick Clarkson, M.B.E., M.B., B.S., F.R.C.S.(Hon.), Civilian Consultant Plastic Surgeon, the Queen Alexandra Hospital, London. London, 1952, Henry Kimpton, 408 pages with 536 illustrations and 309 figures. Price, 60 shillings.

This book presents the theoretical basis and practical aspects of functional orthodontic therapy. The discussion of fixed appliances as used in the United States has been omitted. The use of plates in orthodontics dates back to the second half of the nineteenth century, when Kingsley devised his retention plate. It was not until 1927 that Andresen began to use the "activator" appliance. This consists of a plate with flanges covering the inner surfaces of the mandibular teeth and alveolar mucosa. The appliance produces changes in the tissues in which the teeth are lodged by functional stimulation of the jawbones. The teeth receive continuous stimuli, produced in function when the plate is in position.

The masticatory system is approached here as a functional unit which includes the teeth, jaws, associated muscles, temporomandibular joint, cheeks, lips, tongue, palate, and floor of the mouth. This reviewer has pointed out (1948) that the teeth are not free agents, and fixed orthodontic appliances which can readily effect tooth movement must be used with due consideration of the fact that the teeth are part of "a closed functional system." Mershon recognized this phenomenon when he stated that the teeth can be moved almost a will but "Nature" will decide where they will remain when orthodontic tooth movement is discontinued. If we substitute the word "function" for "Nature," we arrive at a unanimity of opinion concerning the role of the teeth in the masticatory system.

Cephalometrics as mentioned here is largely confined to contributions of A. M. Schwarz, Korkhaus, and de Coster. Orthodontic diagnosis in this text is based chiefly on the work of the aforementioned and of Andresen and the authors. Reference to the contributions of Americans in the field of cephalometrics is embraced in the statement: "Broadbent has studied the growth of the face in the child by cephalometric methods. Margolis has also thrown further light on this subject."

American readers will find the section on orthodontic treatment by "purely functional therapy" of arresting interest. Development, formation, and transformation of tissues by functional stimulation was first pointed out by Roux in 1883. It is on this philosophy that the activator appliance is based. A detailed description is presented of the activator appliance as originally designed by Andresen. The method of taking the "working bite" and construction of the plaster articulator are described. How to obtain various tooth movements with the aid of the activator appliance is presented in detail.

Active functional therapy differs from the passive functional type. In the latter, the tissues are influenced by the basic appliance. Active functional therapy is accomplished with the aid of springs, elastics, and expansion screws

used in conjunction with the plate. The use of Nord's expansion plate is discussed. Schwarz's "arrow-head" spring and Fischer's expansion plate, Herbst's attachment and other European adaptations are explained.

Häupl, who has contributed extensively to the knowledge of tissue changes following orthodontic therapy, describes his findings in the use of the functional appliance. After using the appliance for three nights, Häupl demonstrated the beginning of bone transformation. An important and significant section is one on tissue changes following the use of active orthodontic appliances.

American readers will find the book of interest in comparing European methods with those used here, even if they continue to employ the standard appliances which are attached directly to the teeth.

J. A. S.

News and Notes

American Association of Orthodontists 53rd Annual Meeting

We of the Deep South want to extend our greetings and let you know that we are expecting you in New Orleans for our 1957 meeting. The dates are May 13 through 16.

The Program Committee has managed a fine educational meeting and the Local Arrangements Committee is working to make your visit enjoyable.

Bring the ladies. In New Orleans there are many things of interest which they will enjoy. Even though they have visited here before, there is much for them to do and see.

The New Orleans Hotel Association has requested that your reservations be handled by our local committee. Dr. Bertney G. Frick, Jr., 1231 Maison Blanche Bldg., is chairman of this committee.

Remember, we will be expecting you next May.

S. D. Gore, *General Chairman*

Meeting of the American Board of Orthodontics

The American Board of Orthodontics held its annual five-day meeting in Boston, Massachusetts, April 24 through 28, 1956, for the purpose of conducting routine business and examining candidates for certification.

The unanimous choice for the new director to be appointed to the Board was Burl F. Dewel, Evanston, Illinois. Dr. Dewel replaces C. Edward Martinek, whose term of office expired at the time of the Boston meeting. Dr. Martinek served as president of the Board during his final year of service, and as its secretary during the five preceding years.

In the final session the Board adopted, by acclamation, the following tribute:

> In the closing moments of the official session for 1956, the directors wish to express to the retiring president, Dr. C. Edward Martinek, appreciation for his years of devoted service to the American Board of Orthodontics. He has combined exceptional native ability with plain hard work in such a way as to provide a model for all similar endeavors. As secretary he sought only to reflect the considered views of the Board, and as president he has provided efficient, but never imperious leadership. In extending our thanks to him at this time, we speak not only for directors, past and present, but for every candidate who has appeared before the Board during his tenure of office.

One change in the rules concerning application for certification should be of general interest: The required minimum period of active membership in the American Association of Orthodontists was changed from three years to two years. Henceforth, any orthodontist who has been an active member of the American Association of Orthodontists for two years and complies with the other stipulations concerning making application may submit his application to the secretary of the Board. This change was made because the previous requirement of three years was in conflict in many instances with another requirement which stipulated that a man must have been in the exclusive practice of orthodontics for at least five years. The two provisos are now consistent with one another.

Certification was granted to twenty-two candidates as follows:

J. William Adams
William Biederman
H. Allen Bimston
Harvey Jerome Cole
Henry Greenberg
Saul Hirscher
John William January
Kent W. Jones
Henry Kaplan
John F. Kitchton
Donald Charles MacEwan
Joe Dayton Peak
George Yale Richman
Richard A. Riedel
Harold J. Rosenberg
Everett Shapiro
Merlin A. Spain
Irwin N. Tekulsky
Elmo Wilson Tucker
Frank Carleton Welch
Arnold W. Wieser
James Lawrence Wilson, Jr.

The next meeting of the American Board of Orthodontics will be held at the Roosevelt Hotel in New Orleans, Louisiana, May 7 through 11, 1957. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. Wendell L. Wylie, University of California, School of Dentistry, San Francisco 22, California.

Applications for acceptance at the New Orleans meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1957. To be eligible, an applicant must have been an active member of the American Association of Orthodontists for at least two years.

Angle School of Orthodontia
Class of 1903

The accompanying photograph was loaned to the editor by Dr. Ira Lehman of Detroit, Michigan, and we believe that it will be of interest to the readers of the AMERICAN JOURNAL OF ORTHODONTICS. This is reported to be the Class of 1903 of the Angle School of Orthodontia, held in St. Louis, Missouri, at the Academy of Science. The fourth man, left to right, in the upper row has not been identified. The editor will appreciate learning the identity of this man from any reader who may know. Three (possibly four) of the members of this class are still living. The entire group was responsible for much of the momentum gathered so quickly early in the century for the new specialty of orthodontics, as will be seen from the following brief summary of their achievements.

Lloyd Lourie: Developed the high labial appliance; past-president of the American Association of Orthodontists.

Edmond Wuerpul: Artist (in orthodontics) and teacher.

Edward H. Angle: Teacher and scholar without equal.

Richard Summa: Teacher at the Angle School of Orthodontia and the University of Iowa (musician).

Milton T. Watson: Pioneer orthodontist in Detroit, Michigan, and teacher at the University of Michigan.

Martin Dewey: Teacher and one of the brilliant minds and speakers in dentistry of all time.

Frederic Kemple: Pioneer orthodontist of New York, New York.

C. A. Hawley: Developed Hawley retainer; pioneer orthodontist of Washington, D. C.

G. Mendel: Pioneer orthodontist of Minneapolis, Minnesota.

Newcomb: Pioneer orthodontist, Cleveland, Ohio.

Herbert Pullen: Pioneer orthodontist of Buffalo, New York; prolific author and teacher.

Frank Casto: Dean of Dental Department, Western Reserve University; past-president of American Dental Association and American Association of Orthodontists; pioneer orthodontist of Cleveland, Ohio.

M. N. Federspeil: Became one of the leading cleft palate surgeons of Milwaukee; practiced orthodontics for a short time.

Albert H. Ketcham: Pioneer orthodontist of Denver, Colorado; founder of Ketcham Award; pioneered dental x-ray; prolific author, teacher, and investigator; probably one of the most dedicated men in the specialty of orthodontics for all time.

Willard T. Flint: Pioneer orthodontist of Pittsburgh, Pennsylvania; author and teacher; father of two sons who became orthodontists.

Class of 1903, Angle School of Orthodontia.

Lower row, left to right: Lloyd Lourie, Chicago, Illinois; Edmond Wuerpul, St. Louis, Missouri; Edward H. Angle, St. Louis, Missouri; Richard Summa, St. Louis, Missouri; Milton T. Watson, Detroit, Michigan.

Middle row, left to right: Martin Dewey, Kansas City, Missouri; Frederic Kemple, New York, New York; C. A. Hawley, Washington, D. C.; Miss G. Mendel, Minneapolis, Minnesota; Newcomb, Cleveland, Ohio; Herbert Pullen, Buffalo, New York; Frank Casto, Cleveland, Ohio.

Upper row, left to right: M. N. Federspeil, Milwaukee, Wisconsin; Albert Ketcham, Denver, Colorado; Willard T. Flint, Pittsburgh, Pennsylvania.

Central Section of the American Association of Orthodontists

The Central Section of the American Association of Orthodontists will meet Oct. 1 and 2, 1956, at the Edgewater Beach Hotel in Chicago, Illinois.

Great Lakes Society of Orthodontists

The twenty-seventh annual meeting of the Great Lakes Society of Orthodontists will be held at the Chateau Laurier in Ottawa, Ontario, Canada, Oct. 7 through 10, 1956.

Middle Atlantic Society of Orthodontists

The annual meeting of the Middle Atlantic Society of Orthodontists will be held Oct. 14, 15, and 16, 1956, at Haddon Hall, Atlantic City, New Jersey. T. M. Graber, Chicago, Illinois, B. F. Dewel, Evanston, Illinois, and Harlan Shehan, Jackson, Michigan, will take over the scientific program. Daniel E. Shehan of Baltimore, Maryland, is president.

Northeastern Society of Orthodontists

The fall meeting of the Northeastern Society of Orthodontists will be held in Hartford, Connecticut, Monday and Tuesday, Oct. 29 and 30, 1956, at the Hotel Statler.

Pacific Coast Society of Orthodontists

The Pacific Coast Society of Orthodontists will meet in Seattle, Washington, Aug. 13, 14, and 15, 1956.

The headliners of the meeting will be:

Walter R. Bedell, Poughkeepsie, N. Y.: Active and Passive Treatment With Soft and Hard Tissue-Borne Appliances Alone and in Conjunction With Various Dental Orthodontic Appliances.

Robert F. Hagerty, Charleston, N. C.: The Development of Cleft Lip Repair and Its Orthodontic Significance.

Francis Calmes and Victor Bowles, Kansas City, Mo.: Multiphase Philosophy and Technique.

There will be papers, clinics, and symposiums on such timely subjects as early mixed dentition treatment, anchorage preparation, equilibration, and finishing cases.

One of the attractive features will be the rotation round-table discussion luncheon, where the clinicians may be met more personally and their subjects discussed.

If there is ever a time when the Northwest is most beautiful, it is in August. A scenic boat trip up through the Straits of Joan d' Fuca (lined with fir trees and backed with snow-capped mountains) to quaint, old-fashioned English Victoria will be an occasion never to be forgotten.

During the three days previous to the convention, the city will be celebrating the annual Seafair with parades, aqua follies, and the world-famous major boat races on Lake Washington. Here such record-breaking hydroplanes as the Slo-mos will perform.

You are invited to the Northwest especially for August 13 to 15.

Southern Society of Orthodontists

Under the leadership of Dr. William M. Jarrett, president, the thirty-fifth annual meeting of the Southern Society of Orthodontists will be held at the Greenbrier Hotel at White Sulphur Springs, West Virginia, Aug. 19 through 22, 1956.

The committee consists of Drs. Ralph Rudolph, Chairman, Charles Hopkins, Carl A. Laughlin, Hubert E. Martin, Richard K. Steiner, and J. Mark Trach. It is announced that an attendance of 300 is expected. The meeting is being held in midsummer, and at a resort hotel, and elaborate provision is being made for outdoor entertainment in addition to the scientific program.

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists will meet Oct. 7 to 10, 1956, at the Shamrock-Hilton Hotel in Houston, Texas.

Denver Summer Seminar

The nineteenth annual meeting of the Denver Summer Seminar will be held at the Brown Palace Hotel, Denver, Colorado, July 29 to Aug. 3, 1956.

Australian Society of Orthodontists

The general meeting of the Australian Society of Orthodontists was held on March 8, 1956, during the fourteenth Australian Dental Congress in Melbourne.

Officers elected at that time were:

President: K. T. Adamson, 111 Collins St., Melbourne.
Hon. Secretary: D. F. Spring, 100 Collins St., Melbourne.
Hon. Treasurer: R. Morris, 145 Collins St., Melbourne.

Temple University

Temple University School of Dentistry announces a two-week course in advanced orthodontics beginning Jan. 20, 1957, under the direction of Dr. Robert H. W. Strang. The course is given to practicing orthodontists only.

O.A.S.I.

According to Earl S. Leman, D.D.S., secretary of the Congress of American Dentists for O.A.S.I., the Senate Finance Committee approved a Social Security bill to include coverage of self-employed practicing dentists. The bill will provide coverage for dentists over 65 years of age, who would meet the minimum requirements of six quarters of time; it also contains a five-year drop-out feature which, in effect, makes it retroactive to Jan. 1, 1955. It is expected that the bill will be reported out of the Senate Committee the week of June 4; thereafter it will be sent to a House-Senate Conference Committee for final revision. However, the coverage of self-employed dentists will not be an issue in conference, since both houses are in accord with such coverage. It is estimated that the bill will be ready for a floor vote approximately July 1, 1956.

Notes of Interest

Roy T. Bovard, D.D.S., announces that as of June 1, 1956, C. Clinton Warren, D.D.S., will be associated with him in the practice of orthodontics, 348 Alhambra Circle, Coral Gables, Florida.

Victor Drumm Bowles, D.D.S., M.S.D., and Francis M. Calmes, D.D.S., M.D.Sc., announce the opening of their offices, Suite 417, Plaza Parkway Bldg., 4620 J. C. Nichols Parkway, Kansas City, Missouri, practice limited to orthodontics.

Maxwell S. Fogel, D.D.S., and Jack M. Magill, D.D.S., announce the removal of their offices to the Rittenhouse Plaza, Suite 2-F, 1901 Walnut St., Philadelphia, Pennsylvania, practice limited to orthodontics.

Dr. Stephen C. Hopkins announces the association of Stephen C. Hopkins, Jr., B.S., D.D.S., in the practice of orthodontics, 1746 K St., N.W., Washington, D. C.

Dr. Andrew F. Jackson wishes to announce that he will discontinue his practice at 1218 Medical Arts Bldg., Philadelphia, Pennsylvania, on June 30, 1956. After that date he will continue a limited practice at 26 Montgomery Ave., Cynwyd, Pennsylvania.

A. R. Lombardi, D.D.S., announces the opening of his office in the Medical Arts Bldg., 8-12 Clifton Pl., Jersey City, New Jersey, practice limited to orthodontics.

Dr. Armand Stella announces the opening of his office at 69 W. Ridgewood Ave., Ridgewood, New Jersey, practice limited to orthodontics.

Robert H. W. Strang, M.D., D.D.S., announces the association of I. Fred Gross, D.D.S., for the practice of orthodontics, Room 301, Cilco Bldg., 114 State St., Bridgeport, Connecticut.

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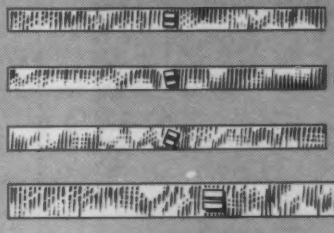

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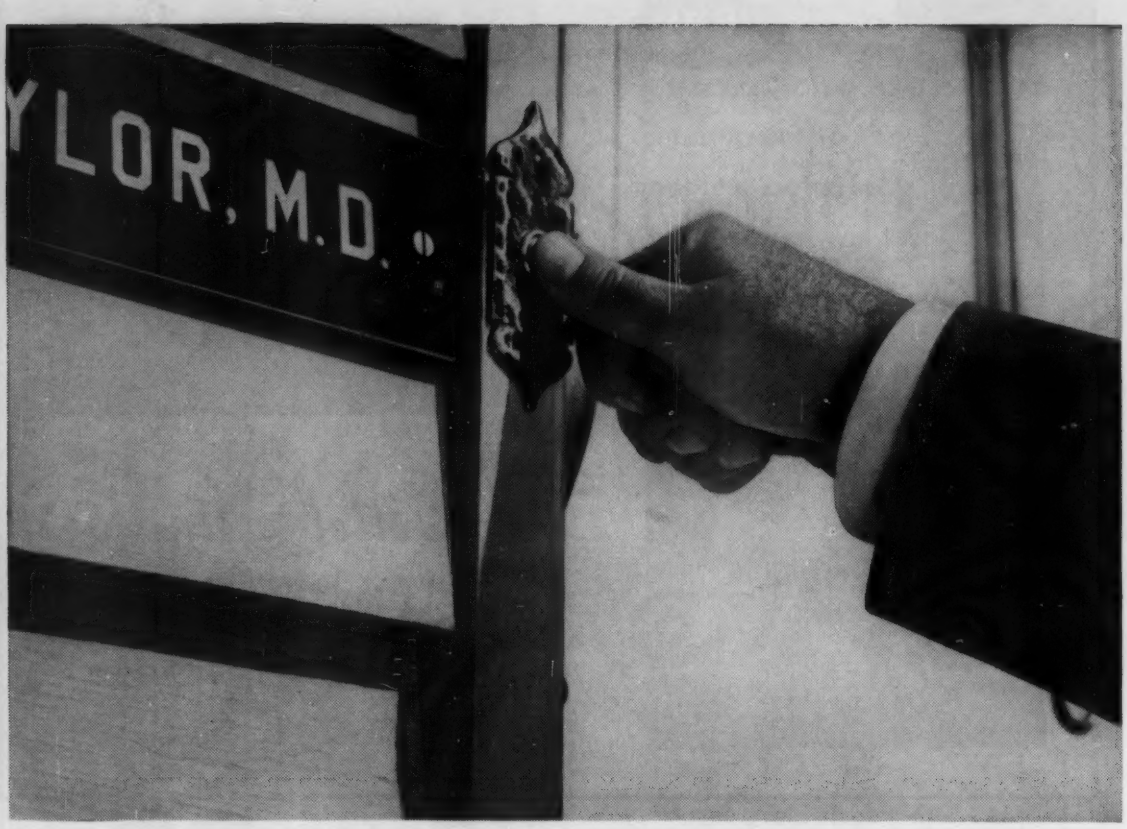

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In cities, towns and villages all over America, the ringing of church bells one day in April will mark the launching of the annual Cancer Crusade of the American Cancer Society. At the same time, in many doctors' offices, the staccato ring of door and telephone bells will mark the success of a major objective of the Society.

"Fight Cancer with a Checkup" is the American Cancer Society's immediate, short-range answer to the terrible toll of lives taken each year by this dread disease. It is to your office that the Society is urging the public to go for the periodic examinations that can mean the early detection and prompt treatment of cancer, and could prevent thousands and thousands of needless deaths.

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American Cancer Society

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